The UNESCO Courier

A window open on the world

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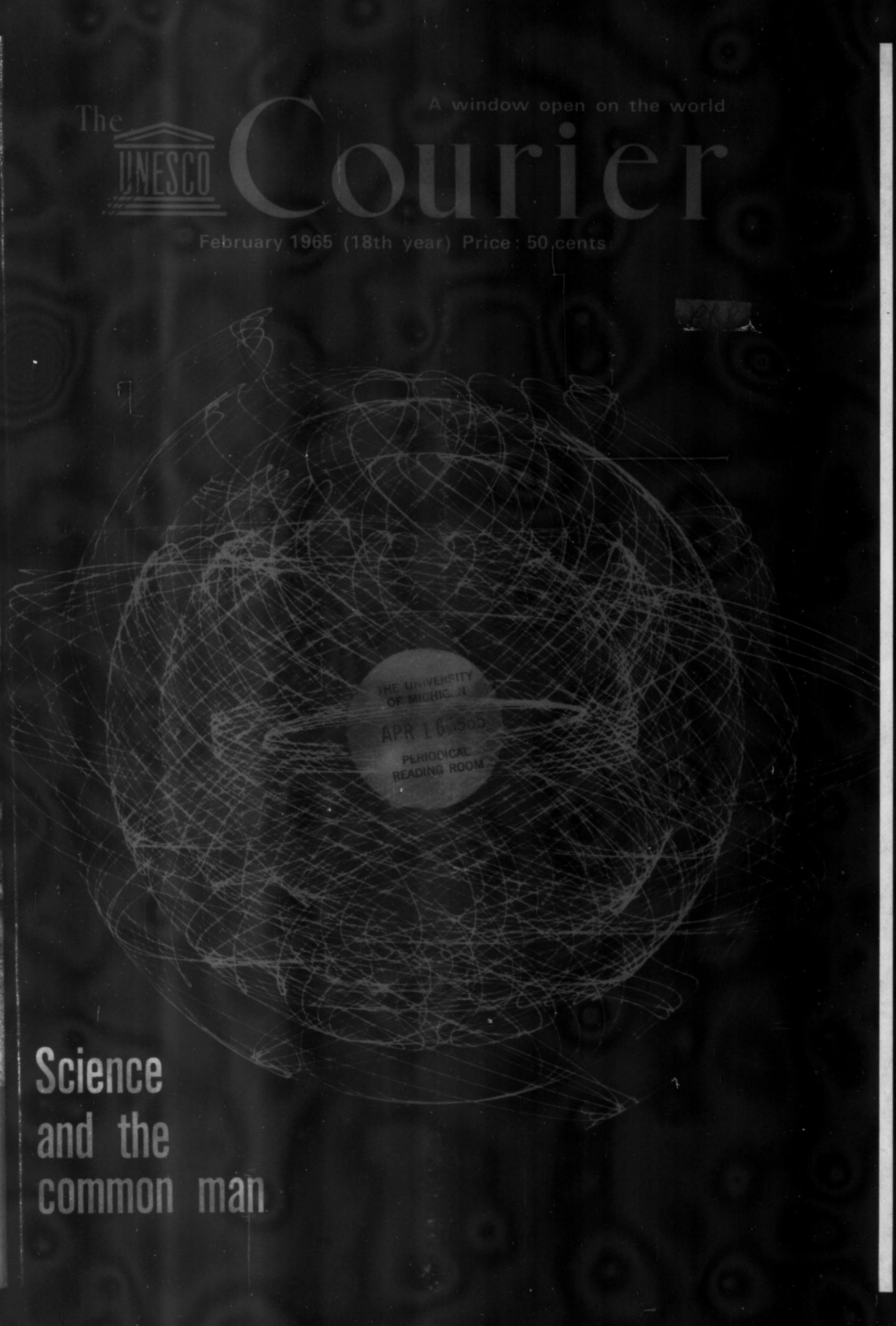

THE UNIVERSITY OF MICHIGAN
APR 16 1965
PERIODICAL READING ROOM

Science and the common man

Black rhino and friends

In prehistoric times the rhinoceros roamed the world from East Asia to North America and from Siberia to southern Africa. Today in India and Indonesia three species of this huge animal (named from the Greek words "rhinos" for "nose" and "keras" for "horns") still survive as well as the two-horned species that live in Africa, the white or "square lipped" and the slightly smaller "black" rhinoceros which weighs around two tons. Perched on the back of the black rhinoceros shown here (which incidently was born without ears) are some of the birds which befriend these huge beasts by eating the ticks which creep into the folds of the dark grey skin. In the past century thousands of rhinos have been hunted down for the sake of their horns (sometimes over 50 inches long) which were believed by some peoples to have certain medicinal properties. Today rhinoceros hunting is prohibited or strictly restricted in most African territories. The white rhinoceros in particular survives only because of measures adopted for its protection. (See p. 15).

Photos © Myers, Nairobi

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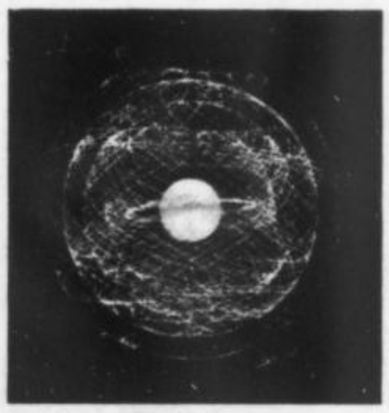

COVER PHOTO

This model of a uranium atom was made by taking a time-lapse photo of the circular movements of 92 light bulbs, representing electrons, mounted on steel rods. White sphere in centre represents nucleus of tightly packed protons and neutrons. Such models can help to make the complexities of science vivid and intelligible to the layman (see page 4).

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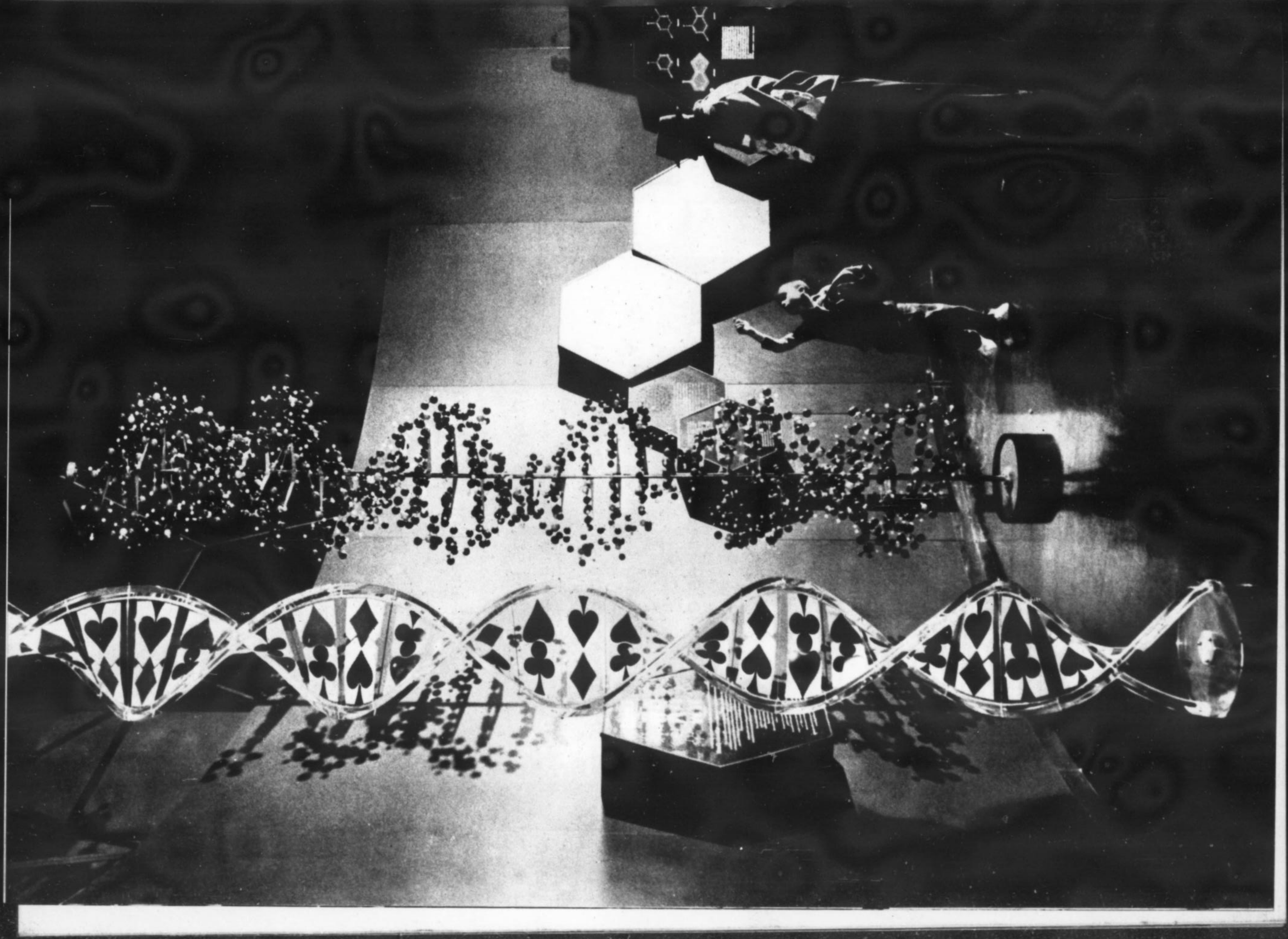


SCIENCE AND THE COMMON MAN

by Ritchie Calder

One of the great scientific discoveries of the past few years has been the unravelling of the mechanism of heredity. Scientists have found that the genes, which determine the nature of new organisms as they are passed from parents to children, are molecules of deoxyribonucleic acid (DNA), the fundamental building blocks of heredity. These are arranged in special patterns which scientists have begun to decode. Left, visitors to a "Methods of Science" exhibition examine a model of the DNA molecule. Playing cards in the "ladder" to the left of the model symbolize the elementary units of the detailed chemical code in the DNA molecule.

USIS

IGNORANCE of the law, it is said, is no excuse. In the mid-twentieth century ignorance of science should be no excuse. For, while the first of these statements does not assume that everyone should have a law degree, and the second should not imply that everyone should be a science graduate, the truth is that science has become the social dynamic of our times. It dominates international politics. It threatens our lives and our livelihoods, or, if it is properly applied, it can promise a fuller and a more meaningful life. Yet a great gulf of language and of experiences separates the scientist in his specialty from the wider community, and this separation is fraught with danger for our civilization and for science itself.

Science, which exists to remove mystery and magic, has created its own mystery and its own magic. People, in ignorance through lack of explanation, regard science with a kind of superstitious awe and, at the same time, want science to produce those miraculous gadgets and cures which a certain type of popular journalism has taught them to expect and, indeed, to take for granted. In the absence of a proper understanding of the methods and the processes of science and of any social integration of scientific knowledge, the apparent haphazardness of discovery encourages a popular attitude towards science which is mistrustful and unhealthy. People fear what they do not understand.

Science, by its emphasis on experimental research, has forsaken natural philosophy, and in its hurried retreat from scholasticism is forgetting the scholarliness in which it made common ground with the humanities. By the same token, those humanities have lost touch with science. Overspecialization gives the scientists the excuse for saying: "We have no time for other subjects"; and their colleagues in the arts, the excuse for saying: "If it takes the scientist so long and so close a study to learn, how can we be expected to understand?"

The fragmentation of science into more and more branches, each with its own specially invented jargon, is dividing the scientists themselves and making it difficult or often impossible for one scientist to understand another, much less make himself intelligible to the wider public. In our schools and universities, by over-early and continuing segregation, one section of our citizenry is given too little science and another section too much.

This is as much a criticism of the humanities as it is of the science faculties. It is not only a question of reconciling, somehow, the "Two Cultures" of which Sir Charles Snow has spoken; it is a question of how far we can get to the mass of the community an understanding of the forces which are determining their very existence. Pierre Auger's estimate that 90 per cent of all the scientists that have ever lived are alive today, has become a cliché. The other 10 per cent have their niches in the Corridor of Time which stretches back to the time when Thinking Man first mastered fire.

But the word "scientist" is itself a comparatively recent invention. The word did not exist in English nor, as far as anyone knows, in any other language until 1841. Before that the inquirer into natural phenomena was a "man of science". As late as 1895 the London "Daily News" was still protesting about "scientists" as "this American innovation" and to his dying day H.G. Wells insisted that the proper term was "man of science".

The distinction is important. The "man of science" belonged with the virtuosi, like Pepys, Wren, Evelyn, Bishop Ward, Governor Winthrop, William Petty (the father of political economics) as well as with Boyle and Hooke, the men who founded the Royal Society.

They belonged in the Lunar Society of Birmingham, where James Watt, the inventor of the steam engine, would argue

CONT'D ON NEXT PAGE

The 'Two Cultures' on speaking terms

music with Herschel, the Astronomer Royal, who had been a German bandmaster; where Joseph Priestley, the discoverer of oxygen, would discuss politics as readily as chemistry and eventually had his house in Birmingham burned for his pains by the mob; where Erasmus Darwin speculated about evolution, which his grandson Charles was eventually to define, and wrote poetry on his way home, by moonlight, to Lichfield; where William Small could be found (who, at Williamsburg, had been Thomas Jefferson's Professor of Natural Philosophy and who had taught him the checks and balances of Newtonian physics which were built into the American Constitution); where Josiah Wedgwood, the potter, could learn from Priestley's oxidization, and go out and find non-ferrous clays for his fine white porcelain.

Such men discussed everything, including science, with minds unbuttoned like their breeches' bands. A "man of science" could converse and communicate with any other educated man (the fact that educated men were a small élite, in those times, is another matter). There was no barrier of language. They were the gifted amateurs. Any educated man could be intelligible to another because the scientific terms which they used were based on the roots of Latin or Greek and they meant, descriptively, what they said.

By the middle of the nineteenth century, men were becoming "scientists" and the "-ist" meant that they were ceasing to be amateurs or natural philosophers or "men of science", on speaking terms with their colleagues in the humanities; they were for their own specialized purposes inventing their own language of convenience.

TWO hundred years before, in 1640, Jan Comenius, the great Bohemian educationalist, had a proposal which would have incorporated science in wisdom. His ideas of education command the respect of pedagogues today, but there was one aspect of his contribution which particularly affected science; that was his Pansophicon.

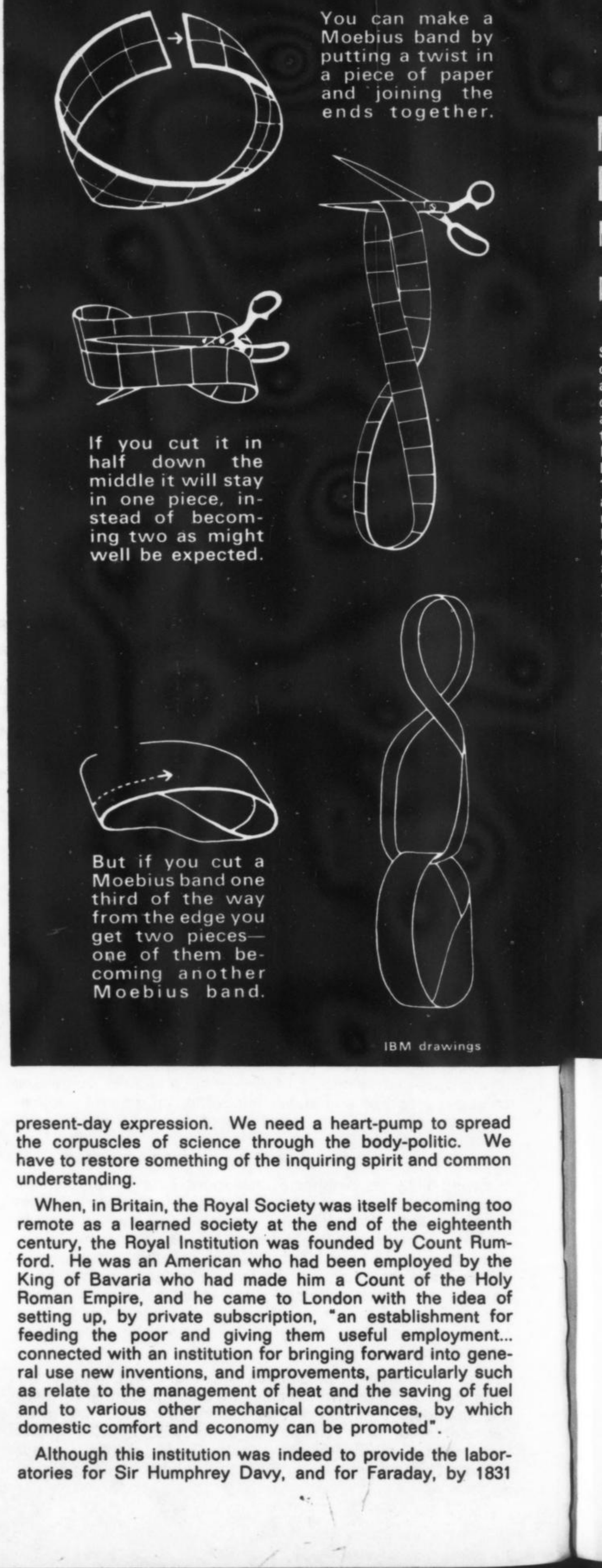
There is no doubt that his idea was inspired by Sir Francis Bacon's "House of Salomon" in "New Atlantis" but Comenius spelt it out. His idea was to create a college at which the wise men of the world would foregather, for a year at a time, and bring with them, and assess and explore, all the natural knowledge, collected from all over the world, and propound it and make it widely known for the adoption by men for their benefit.

It was an idea which appealed to responsive minds in Britain, and he was invited to London. His enterprise was so well received that the Seminary of St. James's, Chelsea, was actually earmarked for the college. The ways and means of setting this up were to be discussed in Parliament in the fateful session in which the Civil War broke out. Charles I lost his head; Comenius lost his college, and the building which had been assigned to the project was given by Charles II, at the instigation of Nell Gwynn, to house the veterans of wars. Today the Royal Chelsea Hospital for Pensioners is where the Pansophicon might have been. The idea did not become entirely lost; it influenced the virtuosi, who met as the "Invisible College", first in London and then at Oxford, and who conceived the Royal Society of London, the prototype of all National Academies.

In its way the Lunar Society of Birmingham was also an offspring of the Pansophicon, and today the Princeton Institute of Advanced Studies reflects Comenius's intention. But it is not only on the high, intellectual level of synthesis and assimilation, as at Princeton, that Comenius needs his present-day expression. We need a heart-pump to spread the corpuscles of science through the body-politic. We have to restore something of the inquiring spirit and common understanding.

When, in Britain, the Royal Society was itself becoming too remote as a learned society at the end of the eighteenth century, the Royal Institution was founded by Count Rumford. He was an American who had been employed by the King of Bavaria who had made him a Count of the Holy Roman Empire, and he came to London with the idea of setting up, by private subscription, "an establishment for feeding the poor and giving them useful employment... connected with an institution for bringing forward into general use new inventions, and improvements, particularly such as relate to the management of heat and the saving of fuel and to various other mechanical contrivances, by which domestic comfort and economy can be promoted".

Although this institution was indeed to provide the laboratories for Sir Humphrey Davy, and for Faraday, by 1831



MOEBIUS BAND

Making child's play of mathematics

Scientific discoveries can be illustrated in a simple way and can even become an amusing game. One of these is the so-called Moebius band or strip. It is named after the 19th century German astronomer and mathematician, August Moebius (1790-1868) who discovered that there are surfaces with only one side and one edge. The Moebius strip is a long rectangular band of paper which is given a half twist before the ends are pasted together. Two surfaces then become a single one. Right, a large 15-foot model, made for an exhibition designed to present mathematics in a popular way. One of the surprising features of the Moebius strip is demonstrated by the arrow at its centre. To move around the strip and return to its original departure position it has to make two circuits, instead of one as on an ordinary two-sided surface.

© Leigh Wiener

it had become more especially a meeting place of the intelligentsia and less committed to the people. This led to the establishment of the British Association for the Advancement of Science. The new association was founded at York in 1831 and one of its objects was to remove the obstacles which stood in the way of the advancement of science, with the clear recognition that one of these obstacles was public ignorance. To that end men of science were invited into the provinces for the annual meetings, which still continue, so that the "man in the moon" could come down to the "man in the street".

When, after the middle of the nineteenth century, science became more and more specialized the British Association tried to correct this trend. In the 1860s it started lectures to the "operative classes", and Tyndall, T. H. Huxley, Lubbock, Preece, Ayrton, Bramwell, Ball and other great figures of the times carried the facts of science into the countryside. There was a great hunger for understanding among the people, who were practically illiterate. In South Wales the miners organized excursion trains from the mining valleys to hear Sylvanus Thompson talk in Cardiff on electricity, and in Bradford a crowd of 3,500 millworkers listened to him with rapt attention for an hour and three-quarters.

Ray Lankester, Richard Gregory and H. G. Wells picked up the torch at the beginning of the twentieth century. Wells, a B. Sc. in biology, could seize on an abstruse paper by Soddy (1911) and understand enough about the transmutation of atoms and the possible release of energy to predict —to the exact year, 1932—the first artificial radio-activity.

Scientists, however, were becoming still more specialized. In 1900, the Royal Society of London abdicated its claims to be a National Academy and sponsored the British Academy, to which it referred problems of philosophy, psychology, social science, literature and so on, while it itself became the learned society of experimental science. "Natural philosophy" survived in the titles of Scottish university chairs, whose professors were physicists. "Physics", which had been a term derived from Aristotle's treatises on

CONT'D ON NEXT PAGE

Cryptic language and private jargons

"natural things", had (except in the Physical Society of Edinburgh, which still belongs to biologists) been expropriated and restricted to "the science treating of the properties of energy and matter (excluding biology and chemistry)".

In place of the free-ranging discussions with benign wine and gentle candlelight at the Lunar Society, we have narrower and narrower briefings in the fluorescent glare of seminar and colloquia where, in their private jargon, the scientists discuss last week's meson, the latest amino-acid synthesis, or a hair on the whisker of a banana-fly. Learned societies, themselves "splinter" groups of natural philosophy, have sub-groups within groups and sub-sections within sections.

It is not surprising, therefore, that the ordinary person thinks of science as a kind of vault to which only a graduate scientist knows the combination, and within it a series of safes labelled "Physics," "Chemistry," "Biology," "Geology," "Astronomy," etc. And each of these has its special combination lock. And inside these safes there are lockers —vast numbers of lockers—marked "Nuclear physics," "Crystallography," "Solid state," "Colloid Chemistry," "Organic," "Inorganic," "Cytology," "Genetics," "Biophysics," "Biochemistry," and so on ad infinitum.

IT is questionable whether anyone, or any body, has ever made a complete list of all the so-called branches of science. What makes it worse, of course, is that each invents its own private language. It would not be so bad if they would admit that it is their language of convenience, a shorthand, with grammalogues peculiar to the inventor and to the small esoteric group around him, but so many scientists assume that their code-language is common language and that somehow people are ignorant or stupid if they do not understand. Much even of the normal language of science has been corrupted away from meaning by usage.

It would be an excellent education and discipline for all scientists if they were to take their latest monograph, eschew all scientific terminology and use, instead, descriptive phrases—not for the edification of the public (or even to oblige science writers like myself) but for their personal, private illumination. It is hard but true to say that a scientist who cannot explain what he is doing does not in fact know what he is doing. Every great scientist has been able to make himself comprehensible—even Einstein tried! It is the lesser scientists without the full confidence of their subject who make themselves defensively unintelligible. Language, therefore, is one of the worst features of this fragmentation of science; in fact, it is not too much to say it is one of the causes of it.

"The trouble about science and scientific explanation is that it tends to be incomprehensible to anyone except the expert," wrote Professor Hyman Levy in the "Literary Guide," June 1955. "Scientists in transforming social life have enormously inflated the language. The influence of the Norman invasion on the English language was profound; yet how far-reaching the influence of modern science has hardly been assessed. Listen to a group of chemists or biologists or mathematicians talking among themselves and you will realize that most Englishmen today no longer know their mother tongue. Even a foreigner may understand more of what is said." (Perhaps one should interpolate "If the foreigner is a chemist, a biologist or a mathematician, of a particular school of chemistry, biology, or mathematics.")

Dealing with the "language" of mathematical symbols, Professor Hyman Levy asks: "You say you want an explanation of Einstein's Theory of Relativity. What kind of explanation? In terms of words of the Anglo-Saxon period and therefore with very nearly the concepts prevalent at that time? In terms of the language of the seventeenth century and therefore with concepts prevalent about the time of Newton? In terms of the language of, say, 1900? In modern technical terms? In modern mathematical symbolism? All these would represent attempts at explanation but how successful could they possibly be?"

Or, this writer might add, in terms of the language of a London bar where, over a glass of beer and bread and cheese, Professor Levy himself once gave me a "translation" of Einstein, which made me sound very convincing that night on the BBC. I admit it was rather like getting a Cree Indian to define atomic energy—which I once did. I found government geologists teaching Red Indian trappers in the Canadian North to look for uranium ore, and I wondered what it all meant to the Cree Indians. I asked the chief of the Crees, what, in his language, was atomic energy. He replied: "Eskotik-otchit kaochipyik," which means "Lightning which comes out of rock."

This question of terminology is propably the most important consideration in the discussion of the communication of science to the wider public. "A nod," it is said, "is a good as a wink to a blind horse." And there is a good deal of nodding and winking by scientists in their dealings with ordinary people who are blind to science, or blinded by science.

As Professor Levy pointed out, scientists, regardless of their native tongue, can generally understand each other. They have enough common ground in terms of their special subjects. This is rather like the craftsmen in the Middle Ages, who moved about Europe, without knowing one another's language, but with the signs and symbols of their specialities. Their craft really were "mysteries" and the mechanical "rites" under the secrecy of a brotherhood were conveyed from generation to generation and from master to apprentice.

Sometimes, one feels, the modern cryptic languages of the scientists specialities have been conceived, as we once invented operational code-names during the war, not to explain, but to deceive. Nor does it help when scientists in one discipline borrow the terminology of another. Like the word "plasma," for instance. The physiologists first used it about 1845 to describe the colourless liquid part of blood, lymph, milk, or muscle. A hundred years ago, the biologists embodied it in the word "protoplasm," the living matters of cells. The classicists should, at that time, have taken exception because, from its Greeks origins, the world should have meant "mould" or "matrix." By their default, however, the biologists acquired it by right of usage and ultimately by the popular sanction of blood donors.

WE now have a new science of plasmaphysics, which means the physics of electrified gases. The term had been used by the fluorescence engineers to mean the flux of positive and negative ions in tube lamps, before it was given a new importance by researches on the harnessing of thermonuclear energy—the putting of the H-bomb into dungarees for civil purposes.

Why "plasma?" In physics, it is certainly not a "matrix," nor is it the biologists' "fluid." If there is any analogy, it is between the ions and the blood corpuscles—the opposite of the physiological usage. At a meeting in the United States, which included physicists and biologists, the physicists talked possessively about plasma until a biologist at the back of the room said plaintively: "Mr. Chairman, can we please have our word back?" "No, you cannot," said the chairman, "the nuclear physicists have so much money they have bought it."

Such borrowing of words causes confusion and is often completely misleading. Sometimes, one suspects, they are condescensions—an example of talking down to less

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Polish Television

Words under a mask

by Seymour Fersh

WHY do men make mistakes?" asks Walter Lippmann, the U.S. writer and political analyst, and answers, "Because an important part of human behaviour is reaction to the pictures in their heads. Human behaviour takes place in relation to a pseudo-environment —a representation, which is not quite the same for any two individuals. What they suppose to be—not what is—the reality of things. This man-made, this cultural environment which has its being in the minds of men, is interposed between man as a biological organism and external reality."

The problem is one of bringing "pictures in the mind" and "external reality" into truer alignment. The best way—though certainly not an infallible one—is through first-hand experiences, followed by audio-visual representations, and lastly by words. It is through words, however, that most of our "education" takes place and much is inevitably lost in the telling as word descriptions are substituted for their real-life counterparts.

Consider words such as poverty, underdeveloped, hot, cold, democratic, progressive, backward, and the like.

CONT'D ON NEXT PAGE

A mental 'etc...' that leaves the door open

Dictionaries carry definitions but people carry connotations —and it is connotations which influence thinking and rule behaviour. Moreover, connotations are not only personal, they are also heavily cultural. A Frenchman, a Cambodian and a Tunisian or an Englishman, an Indian and an American may "understand" the words which each is using when speaking French or English, but whether they will ever "understand" the nuances—the shades of delicate differences in meaning—is quite another matter.

Throughout history many writers in many cultures have called attention to the fact that words misinform as well as inform, but it was not until 1897 that a Frenchman, Michel Breal, gave it the name "sémantique", or the science of meaning. More recently, in the 1920's in the United States, a movement called General Semantics, often referred to as G. S., was pioneered by Alfred Korzybski and subsequently popularized by researchers and writers, including Stuart Chase, Wendell Johnson, S. I. Hayakawa, and Irving Lee.

From these and other writers on the subject, we have drawn a number of examples to illustrate the contribution General Semantics can make to the study of other peoples and ways of living different from our own. We do not claim that greater attention to these and other General Semantics assumptions and techniques will in itself eliminate all problems of "meaning", but it should be incontestable that descriptions of "things out there" can and must be conveyed more precisely and with more accurate interpretation.

The nature of the world is one of dynamic flow—"a mad dance of electrons"—in which no two things are identical, no one thing remains the same and, as Heraclitus expressed it over two thousand years ago, "one cannot step in the same river twice".

The nature of man is that—unlike other living things—he can "receive gifts from the dead" through the use of his man-made language, but his internal experiences are literally "unspeakable". Abstractions take place when he tries to substitute words for reality.

THE nature of languages is like that of a map; it is useful to the extent that it describes the territory accurately. Maps and territories are not the same, however, nor are words and reality interchangeable, though it is by no means uncommon for some people to react to words as they would to a slap in the face. And, of course, advertizers have long known that certain names appear to have the magical effect of seemingly impregnating themselves into a product. Who among us has not purchased an item recently because the name rather than the substance—often untried—appealed to our stream of connotations?

For example, South American (A) is not South American (B) is not South American (C) is not South American (D), etc. In other words, South American (teacher in Lima) is not South American (rural area worker in Brazil), etc. Although by convention we refer to the 150 million people who live in an area called South America as "South Americans", the truth is that no two "South Americans" are identical—including, of course, those who live in the same country or even in the same household. Considered in the same way, each of the estimated seventy-seven thousand million people who have inhabited the earth has been unique.

Statements which purport to talk about "a people" as if they were one entity must obviously be qualified. Questions such as "What do Africans think about Europeans?" are clearly unanswerable. Answerable questions—those which have some likelihood of being verified—are less dramatic and perhaps less satisfying, but that is the nature of the problem. It is only by taking liberties with language that we appear to be better informed than the data permit. Similarly, it may readily be seen that terms such as "Asian", "Moslem", "Oriental", and the like conceal differences as well as reveal group affinities. (1).

Japan (1840) is not Japan (1945) is not Japan (1965) is not Japan (1980), etc. Change is inevitable, though the rate varies. One who forgets this is certain to be shocked when confronted with the discrepancy between what he thinks (or remembers) is true and what is so.

The same may be used to connote different "realities", while similar events or experiences are sometimes called by different names.

FOR example, when someone says that it is hot, the word "hot" is more likely to represent the speaker's state of mind than it is to describe the current temperature reading. "Cold wave" could mean anything from 20 to 30 degrees below zero (F) in Alaska to 40 degrees above zero in New Delhi where, incidentally, a continuous string of days in the 90's in May would scarcely qualify as a "heat wave".

Very often, the addition by the speaker of the words "to me" and the addition by the listener of the words "to you" help to identify so-called statements of fact as really statements of opinion. Words whose meanings have become meaningless from being used to carry too heavy and too diversified loads of information should be set apart by enclosing them with quotation marks to alert the reader. Korzybski used to wiggle two fingers of each hand when speaking to achieve the same effect.

Consider this plea from ancient China, entitled, "On the Standard of Beauty":

"If a man sleeps in a damp place, he gets lumbago and may die. But what about an eel? And living up a tree is frightening and tiring to the nerves. But what about monkeys? What habitat can be said to be absolutely right? Then men eat flesh, deer eat grass, centipedes enjoy small worms, owls and crows delight in mice. Whose is the right taste, absolutely? Monkeys mate with apes, bucks with does, eels consort with fishes, while men admire great beauties such as Mao Chiang and Li Chi. Yet at the sight of these women the fish plunged deep into the water, birds flew from them aloft, and deer sped away. Who shall say what is the right standard of beauty? In my opinion, the doctrines of benevolence and righteousness and the paths of right and wrong are inextricably confused. How could I discriminate among them?" (2).

No matter how complete a listing or how comprehensive an explanation, the possibility always remains open that something more might be said about the matter under consideration. All descriptions are "open-ended" with the last word unsaid. Completeness may be a goal, but like infinity it eludes mortal grasp. Thus for example, an examination of any culture or any country might include reference to its history, its development, its achievements and so on, but these would always be incomplete. No matter how extensive the treatise, a mental "etc." should be added to the last punctuation point. The practical effect of this orientation is to leave the door open, albeit a crack, for additional information which may be forthcoming.

This list of "devices" for applying General Semantics can be extended almost indefinitely. Here are a few more cautions to consider:

● Let us try to use descriptive terms rather than those expressing approval or disapproval. For example, the

(1) For other aspects of this subject we refer the reader to "Twisted Images—How Nations See Each Other". The Unesco Courier, June 1955 (now out of print).

(2) **Through Asian Eyes,** compiled by Baldoon Dhingra. Charles E. Tuttle Company, Rutland, Vermont 1959.

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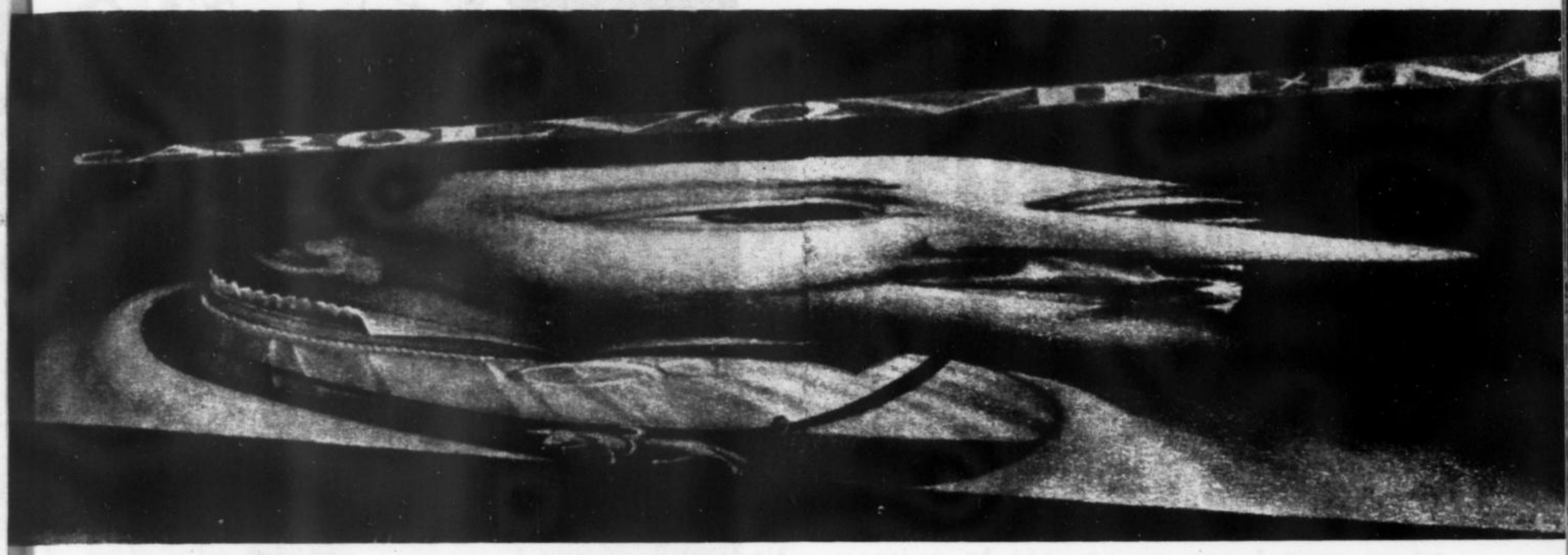
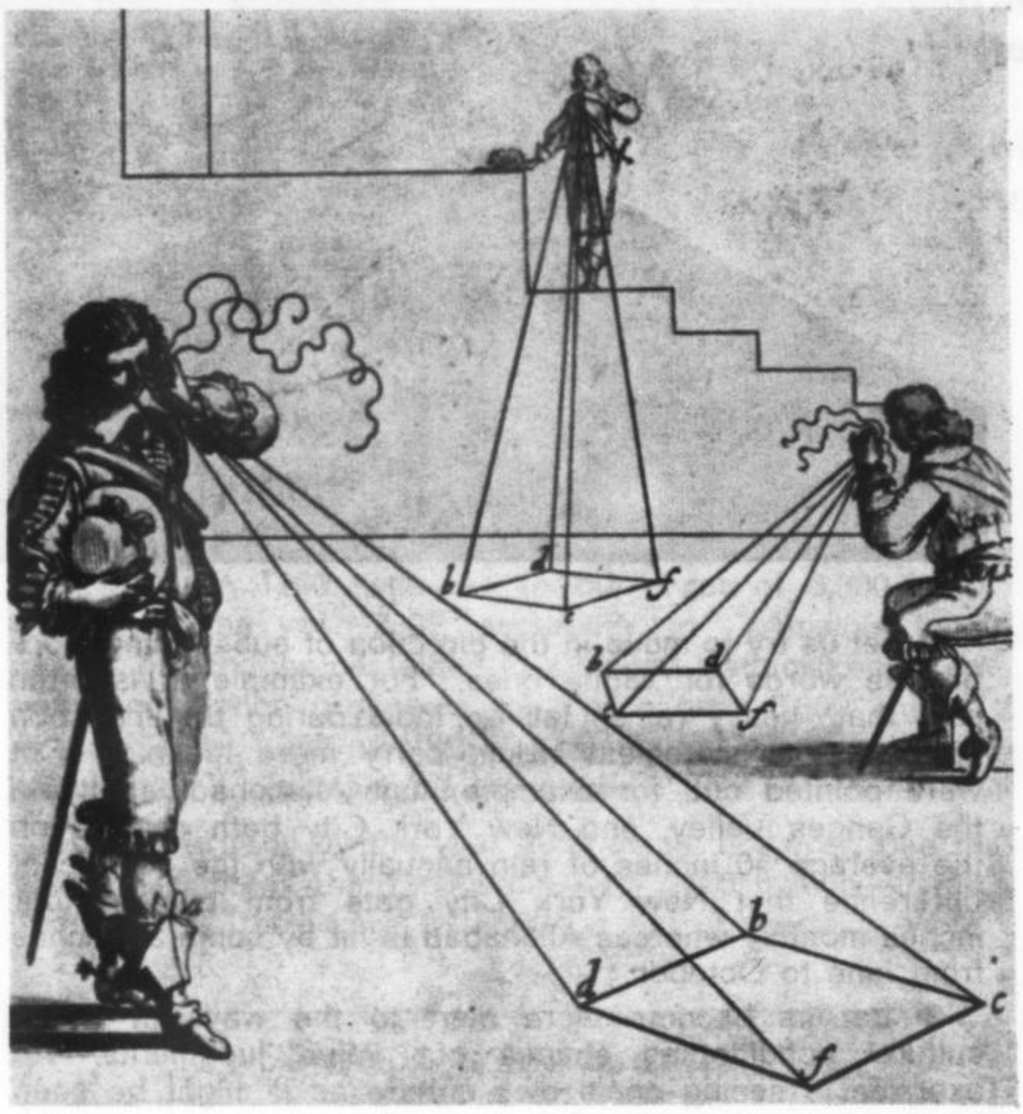


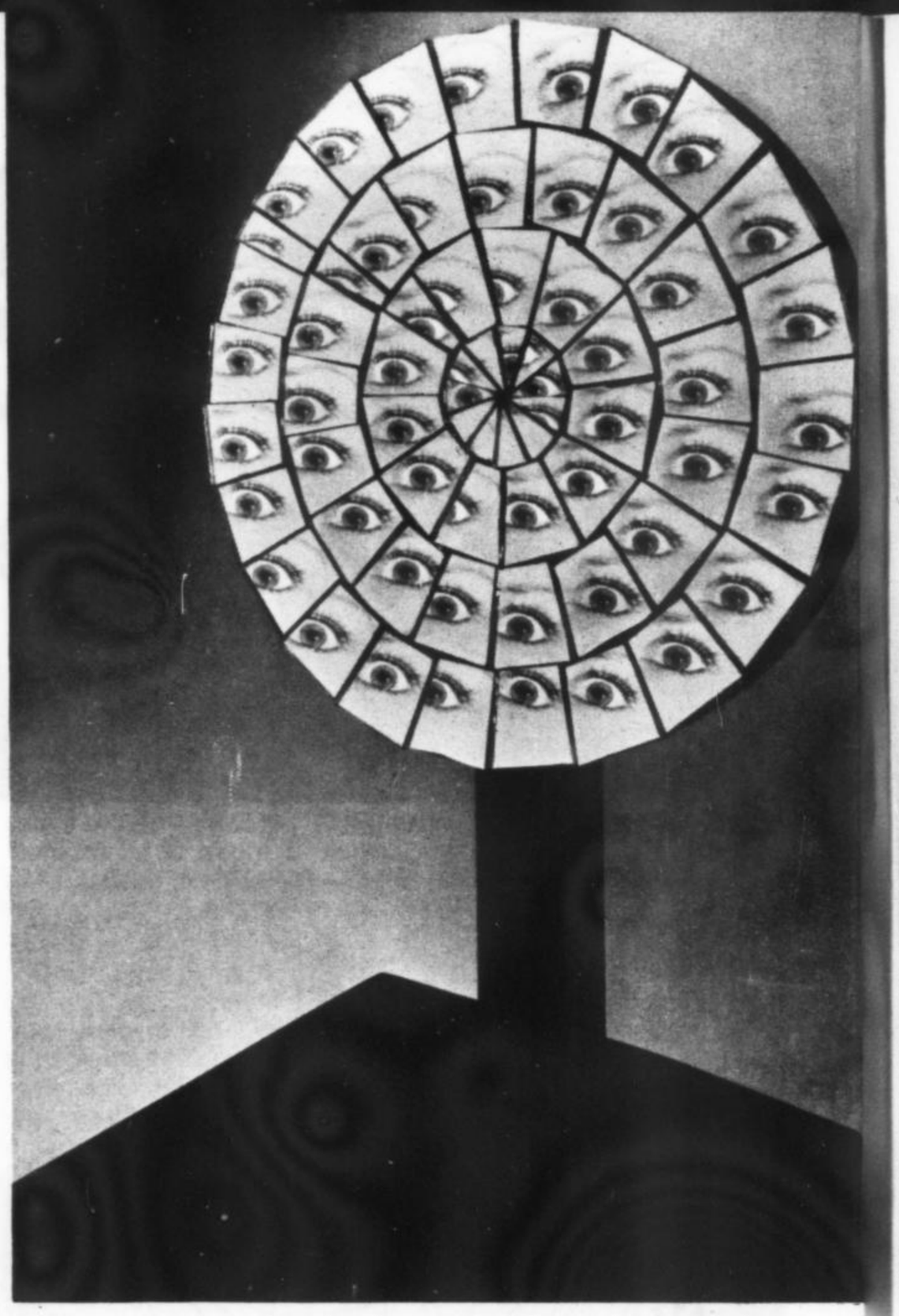


Calculated distortion

Images of grotesque beings? Visions of the supernatural? No, these illustrations are simply examples of anamorphosis. This is the name given to a distorted projection or drawing of anything which when viewed only from a single point appears regular and properly proportioned. During the 16th and 17th centuries, anamorphoses obtained through the use of geometric calculations fascinated artists, painters, engravers and architects and led to much optical research. Great artists like Dürer, Leonardo da Vinci and Holbein executed drawings and paintings of this kind. Above, a portrait of the Emperor Charles V (1500-1558) by an unknown artist. To restore the emperor's feature to their correct proportions the portrait should be viewed at eye level and from left to right. Below, a child's head drawn by Leonardo da Vinci. It appears normal only when viewed at eye level and from a single point diagonally from right to left and from the bottom to the top. Left, "Perspective Hunters" by Abraham Bosse (1648), an engraving representing three researchers engrossed in their studies of imaginary squares on the floor. In the 18th and 19th centuries anamorphosis no longer interested the theorists; it became a popular curiosity and optical divertissement.

Illustrations from "Anamorphoses ou perspectives curieuses" by Jurgis Baltrusaitis published by Olivier Perrin, Paris, 1955.

When the eyes don't have it



Here reflected in the many little mirrors mounted on a concave surface, the appearance of a single eye changes according to the angle from which it is viewed. The multi-eyed disc thus appropriately symbolizes the varied receptivity of different people to realities and to the words which are used to describe them.

USIS-Berenice Abbott

words "clean" and "unclean" are relative. The comment that cow dung is used for fuel in many Afro-Asian villages often provokes reactions of disgust from many urban dwellers the world (1965) over. It may be instructive on this point to quote from an American, writing about his experience on the Great Plains of his country in 1879 when buffalo and cow dung (he calls them "chips") were commonly used for fuel:

"It was comical to see how gingerly our wives handled these chips at first. They commenced by picking them up between two sticks, or with a poker. Soon they used a rag, and then a corner of their apron. Finally, growing hardened, a washing after handling them was sufficient. And now? Now it is out of the bread, into the chips and back again—and not even a dust of the hands."

● Let us try to use phrases which indicate certain conditions which should be considered with a statement. For example, awareness may be increased by using such phrases as "in our culture", "from our point of view," "at that time," and the like.

MISCALCULATIONS often arise through the mistaken notion that other cultures prize the same values as one's own. Here, for example, is what Aldous Huxley wrote following his first trip around the world in 1927:

"So the journey is over and I am back again where I started, richer by much experience and poorer by many exploded convictions, many perished certainties. For convictions and certainties are too often the concomitants of ignorance. Of knowledge and experience the fruit is generally doubt. It is doubt that grows profounder as knowledge more deeply burrows into the underlying mystery, that spreads in exact proportion as experience is widened and the perceptions of the experiencing individual are refined. . .

". . . I set out on my travels knowing, or thinking that I knew, how men should live, how be governed, how educated, what they should believe. I knew which was the best form of social organization and to what end societies had been created. I had my views on every activity of life. Now, on my return, I find myself without any of these pleasing certainties. . .

". . . The better you understand the significance of any question, the more difficult it becomes to answer it. Those who like to feel that they are always right and who attach a high importance to their own opinions should stay at home. When one is travelling, convictions are mislaid as easily as spectacles, but unlike spectacles, they are not easily replaced." (1).

(1) **Jesting Pilate,** Aldous Huxley: New York, Harper, 1928.

● Let us try to move in the direction of substituting more precise words for vague ones. For example, it is often said that "heavy rains" fall on India during the monsoon season. The statement would carry more meaning if it were pointed out, for example, that Allahabad, a city in the Ganges Valley, and New York City both receive on the average 40 inches of rain annually with the significant difference that New York City gets from two to four inches monthly whereas Allahabad is hit by some 37 inches from June to October.

● Let us become more alert to the ways in which cultural conditioning shapes our value judgments. An exercise in seeing one's own culture as it might be seen by a stranger is a useful start. Consider, for example, the following excerpt from an article called, "Body Ritual Among the Nacirema":

"The focal point of the shrine is a box or chest which is built into the wall. In this chest are kept the many charms and magical potions without which no native believes he could live. . .

". . . The charm is not disposed of after it has served its purpose, but is placed in the charm-box of the household shrine. As these magical materials are specific for certain ills, and the real or imagined maladies of the people are many, the charm-box is usually full to overflowing. The magical packets are so numerous that people forget what their purposes were and fear to use them again.

"While the natives are very vague on this point, we can only assume that the idea in retaining all the old magical materials is that their presence in the charm-box, before which the body rituals are conducted, will in some way protect the worshipper." (2).

Here under discussion has been the medicine cabinet in American (Nacirema—spelled backward), or almost any other western culture!

(2) Horace Miner in **American Anthropologist,** Vol. 58, No. 3, 1956.

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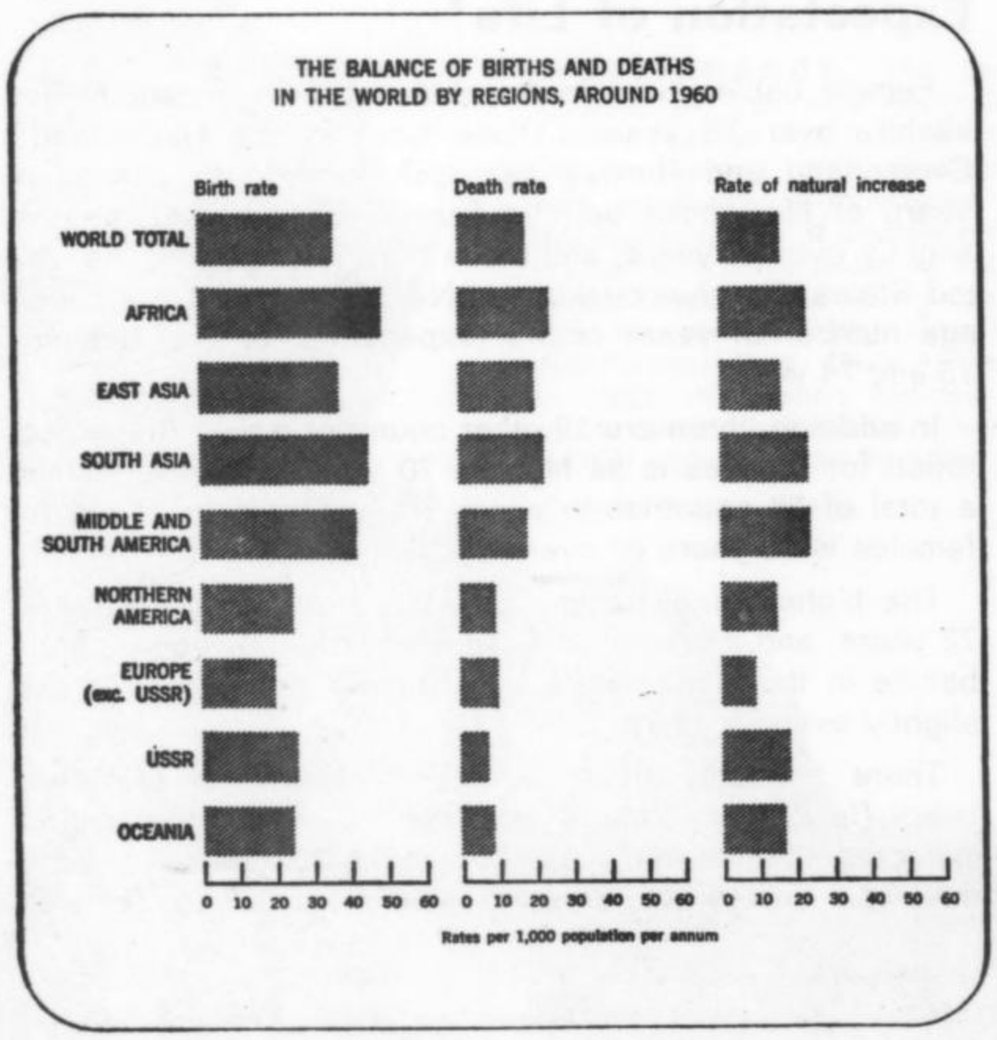
WORLD POPULATION TO DOUBLE BY END OF CENTURY

A population "explosion" of unprecedented size is taking place in vast areas of the world. This extraordinary multiplication of population poses tremendous economic and social problems, particularly in the developing countries. These problems will be examined by the World Population Conference, a scientific meeting of experts on population, to be held in Belgrade, Yugoslavia, in September 1965, under the auspices of the United Nations and with the co-operation of Unesco, FAO, WHO and other international organizations. Below we publish some of the findings of a recent U.N. study on world population prospects for the next 40 years.

WORLD population, approximately 3,000 million in 1960, will rise to the order of 5,300-6,800 million by the year 2000, according to "plausible long range" projections contained in a United Nations report on world population prospects. A figure near 6,000 million, or double the 1960 number, "seems to be the most likely expectation", according to the study.

The world total by the year 2000 could, however, rise to a level 2.5 times the 1960 figure—to 7,410 million—if the 1960 fertility rate were to continue and if mortality were to go on decreasing at the rates which prevailed during the 1950's, an assumption, the report states, "not considered likely to be borne out by future developments."



The study notes that "it is highly probable that events will occur which will bring about changes in the present population trends". "Certain tendencies of development can now be discerned which have fairly definite implications for the near future, and their possible implications for the more remote future are also calculable, though with varying degrees of uncertainly", it states.

The publication, "Provisional Refort on World Population Prospects, as Assessed in 1963", was prepared by the Population Branch of the United Nations Department of Economic and Social Affairs and is being circulated among governments, selected demographic institutes and individual experts for comments and suggestions. On the basis of comments received, a final report will be prepared for publication in the United Nations series of population studies. In 316 pages of text and tables, the report points out that:

■ In nearly all developing countries, there remains considerable scope for rapid decreases in the death rate, so that the prevailing tendency is one of accelerating population growth;

■ The population of most developing countries is now increasing at annual rates ranging from about 1.0 per cent to 3.5 per cent, whereas the rates of most developed countries are between 0.5 and 1.7 per cent;

■ The population of Latin America by the end of the century would be 3.6 times as large as in 1960; Africa and South-East Asia would each have more than three times as many inhabitants, East Asia 2.3 times as many; those of Oceania, North America and the Soviet Union would nearly double; and Europe's population would be increased by one-third;

CONT'D ON NEXT PAGE

Sweden, the country of long life

■ By the year 2000, the share of world population in the now less developed areas would rise from 71 per cent in 1960 to 81 per cent. Very high population densities would be attained in East Asia and South Asia, surpassing the density in Europe;

■ Migration in the future would probably tend to be on a reduced scale and the relative demographic importance of the population movements would be even slighter;

■ The developed countries are undergoing a progressive increase in the proportion of aged persons in the population, which is resulting in a gradual slowing-down of population growth.

The report notes that world population growth has "conspicuously accelerated", due to the immediate effects of mortality decline, and may accelerate further for the same reason. "It is inevitable, however, that this growth must eventually slow down", the report says, but "if fertility does not decline, the prospect of eventual slowing down of the population growth is removed to a more distant future, and the eventual size of the population will be still much larger."

Population Year 2000

(millions of inhabitants)

ZONE	1960	1970	1980	1990	2000
East Asia					
Medium variant	793	910	1,038	1,163	1,284
Continued recent trends	793	941	1,139	1,419	1,803
South Asia					
Medium variant	858	1,090	1,366	1,677	2,023
Continued recent trends	858	1,092	1,418	1,898	2,598
Europe					
Medium variant	425	454	479	504	527
Continued recent trends	425	460	496	533	571
Soviet Union					
Medium variant	214	246	278	316	353
Continued recent trends	214	253	295	345	402
Africa					
Medium variant	273	346	449	587	768
Continued recent trends	273	348	458	620	860
Northern America					
Medium variant	199	227	262	306	354
Continued recent trends	199	230	272	325	388
Latin America					
Medium variant	212	282	374	488	624
Continued recent trends	212	284	387	537	756
Oceania					
Medium variant	15.7	18.7	22.6	27.0	31.9
Continued recent trends	15.7	18.4	22.0	26.7	32.5
World Total					
Medium variant	2,990	3,574	4,269	5,068	5,965
Continued recent trends	2,990	3,626	4,487	5,704	7,410

Trends in Eight World Areas

A section of the publication deals with future population projections up to the year 2000 by eight major areas: East Asia, South Asia, Europe, the Soviet Union, Africa, Northern America, Latin America and Oceania.

Included in this section is a report on population estimates for mainland China. The report refers to the "scarcity and uncertainty of data" and presents population projections according to variously combined assumptions regarding trends in mortality and fertility for mainland China. One of the variants is computed on the assumption of low mortality and late fertility decline. It gives the following figures on the population estimate for mainland China:

1960	**648.1 million**
1980	**916.8 million**
2000	**1,210.0 million**

The adjoining table compares the "medium" and the "continued recent trends" projections of world population by regions up to the year 2000 as calculated in the report:

Infant Deaths*

Despite the continuing downward trend in infant mortality rates throughout much of the world, the range between the lowest and the highest rates is still enormous. Thus, in Sweden, the rate is 15.0 infant deaths per 1,000 live-births, while the recorded or estimated rates are 180.4 in Haiti, 165 in Turkey and 139.3 in Burma.

Very high infant mortality rates are also found in the United Arab Republic (133.9 per 1,000 live-births), Indonesia (125), Chile (116), the Turks and Caicos Islands (107.1) and Ecuador (104).

At the lower end of the scale, in addition to Sweden, are the Netherlands (15.8), Iceland (17), Norway (17.7), Finland (18.0), New Zealand (19.6), Gibraltar (19.6), Australia (20.0), Denmark (20.1) and Switzerland (21.2).

Expectation of Life*

Female babies born in Sweden now can expect to live slightly over 75 years. Those born in the Netherlands, Switzerland and Norway can look forward to almost 75 years of life; those born in France can expect to live slightly over 74 years; and those born in Denmark, the United States, Czechoslovakia and New Zealand have an average number of years of life (expectation of life) between 73 and 74 years.

In addition, there are 19 other countries where life expectation for females is as high as 70 years or more, making a total of 28 countries in which the expectation of life for females is 70 years or over.

The highest expectancy for males born today is almost 72 years, and this applies to those born in Sweden. Male babies in the Netherlands and Norway can expect to live slightly over 71 years.

There are only three additional countries—Denmark, Israel (Jewish population) and Iceland—where the longest expected lifetime for male babies is 70 years or more, making a total of six, as contrasted to the 28 for females.

* Taken from the United Nations Demographic Yearbook 1963.

Sanctuaries astride frontiers

by François Bourlière

IS it pure chance or a happy omen ? After centuries during which jealously guarded frontiers were the most obvious outward sign of "territorial behaviour" on a national scale and the living symbol of an absence of understanding between peoples, the last few years have brought us face to face with a curious phenomenon. On every continent and even in Europe, where friction and open discord have been at their bitterest, there is a growing number of "protected zones" astride the frontiers of two or even three neighbouring States.

In general, they occur in regions oustanding for their spectacular scenery, for their "natural monuments" and the special plants and animals that abound there. These regions have rapidly become great centres of attraction for tourists and have now joined the special localities in the world into which flock young people of every nationality. Within a few years a place that was once a barrier may, on the contrary, become a meeting place.

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ITALY-FRANCE. The ibex, a member of the wild-goat family was in danger of complete extinction in Europe until the species was gradually re-introduced into the Alpine valleys of Switzerland and France from herds raised in the area of the Upper Aosta Valley that has now become the Italian Gran Paradiso National Park. Since its creation in 1953, the French National Park of La Vanoise has shared a common frontier with the Gran Paradiso Park.

© Michel Strobino, Geneva

POLAND - SOVIET UNION. By the end of the First World War the herds of wild bison which once roamed the forests of Europe had been completely wiped out. All the surviving bison were in zoos; by 1930 only 40 animals remained. Since then, thanks to the efforts of the International Society for the Protection of Bison, formed on the suggestion of Poland, the European bison has not only been saved from complete extinction, but its numbers have increased considerably. From stocks raised in Polish breeding centres the first new herd to be allowed to roam freely was released in 1952 in the great forests around Bielowecza (photo right) where Polish and Soviet reserves now meet on the frontier. Poland has also been exporting bison to enable other European countries to start breeding new herds.

© H. Heimpel

SPAIN-FRANCE. Below, a herd of izards (the chamois of the Pyrenees) climbs a névé of frozen snow on the 9,000 feet high Pic du Midi d'Ossau. The protection offered to these and other mountain animals by the long-established Spanish Parque Nacional de Ordesa will be increased if efforts now being made to establish a French national park in the Pyrenees are successful. The combined reserves would assure the future of the brown bear and izards on the mountains and the birds of prey that still nest there.

© La Vie des Bêtes - François Merlet

SANCTUARIES ASTRIDE FRONTIERS *(Cont'd)*

All that is required is for parks established by two neighbouring States across their common frontier to co-ordinate their programmes of preservation and planning and also for traffic controls to be organized at the entrances to protected zones for everything to change very rapidly. Roads that were once the preserve of customs officials and frontier guards become increasingly used by people in civilian clothes—townspeople on holiday. Shelters and youth hostels gradually replace guard posts and customs houses. Tourists from both sides of the frontier discover, with surprise, how alike they are and that they possess a common heritage. Gradually, the wall becomes a bridge.

Which are today's main "protected zones" astride the frontier regions of two or three neighbouring States? In Europe, the oldest and perhaps the most famous is on the frontier between Poland and Czechoslovakia where the Tatras National Park adjoins the Czech reserve bearing the same name. Both parks together form a natural region as spectacular for the tourists as it is of interest to the naturalist.

In a wonderful setting of forests and mountains, specimens of almost all the great carnivora which have disappeared from the rest of the European continent, the brown bear, the wolf, lynx and wild cat, are free to live far from all interference. On mountain ridges, chamois and royal eagles are to be found today as in the past. Rare black storks nest regularly in the valleys. A fact of outstanding importance is that administrators of the Polish and Czech parks hold working meetings together at regular intervals and the numbering of game as well as the arrangement of tourist itineraries are organized in common.

Almost as interesting a region is to be found on the Franco-Italian frontier in the western Alps. In 1922 the former Aosta royal hunt was transformed into the Parco Nazionale des Gran Paradiso, famous throughout the world for its herds of ibex and chamois. This park was the only ibex reserve in the Alps and was the centre from which this species was reintroduced gradually into Switzerland and France.

Since 1963, the Parc National Français de la Vanoise has shared a common frontier with the earlier established Italian park. The ibex and chamois can now pass in and out of these magnificent mountain regions and out of reach of the rapacious hand of the poacher whose depredations have, until now, prevented the natural revival of the "Capra Ibex" in the French Alps.

The Spanish Parque Nacional de Ordesa has been in existence for a long time. It is situated in one of the wildest and most picturesque regions of the central Pyrenees. Those in France concerned with the preservation of wild life hope that before long a national park in the Pyrenees will be established on the northern side of the frontier. This would ensure that the famous Cirque de Gavarnie is protected from vandalism. If this second reserve can be established reasonably quickly and if the area of the Parque de Ordesa can be enlarged even slightly, the future of the brown bear, of the izard, or wild goat, and of several predatory creatures in the Pyrenees will be finally assured.

In another setting far from the great chains of mountains that lend themselves better than anywhere else to the establishment of national parks and recreational areas, another fine example of international co-operation for the protection of areas of refuge for threatened animals is found in the protected zones of the forest of Bielowecza on the Soviet Polish frontier.

This magnificent primeval forest with its fine oaks, lime and fir trees, all that is left of the European virgin forests, has always been particularly well looked after by the Polish preservers of wild life and by naturalists. It was here that the last herd of European wild bison found refuge and it was also here that this interesting ungulate was saved from complete extinction. In 1952 when there was stock of beasts large enough to maintain the species, the first herd was freed. They now roam the great forest lands.

In spite of territorial changes following the Second World War when the Polish-Soviet frontier was made to pass through the middle of the forest, preservation of wild life has continued to develop. The Soviet Government at that

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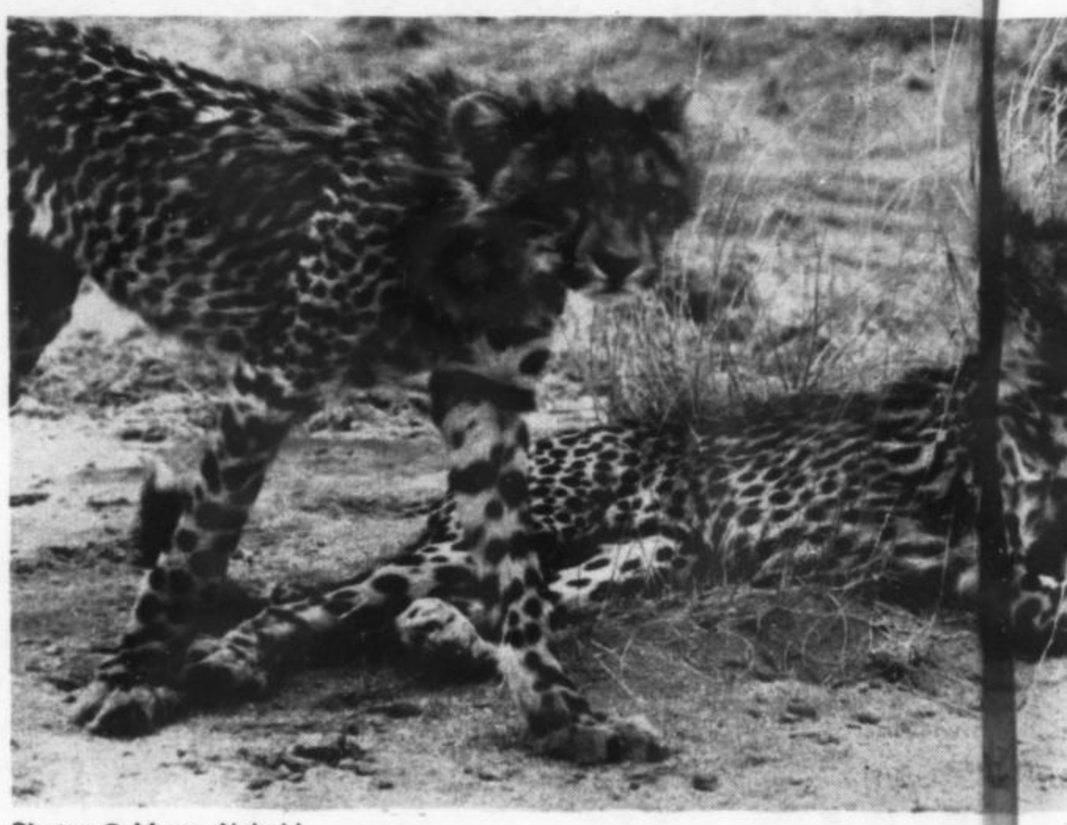
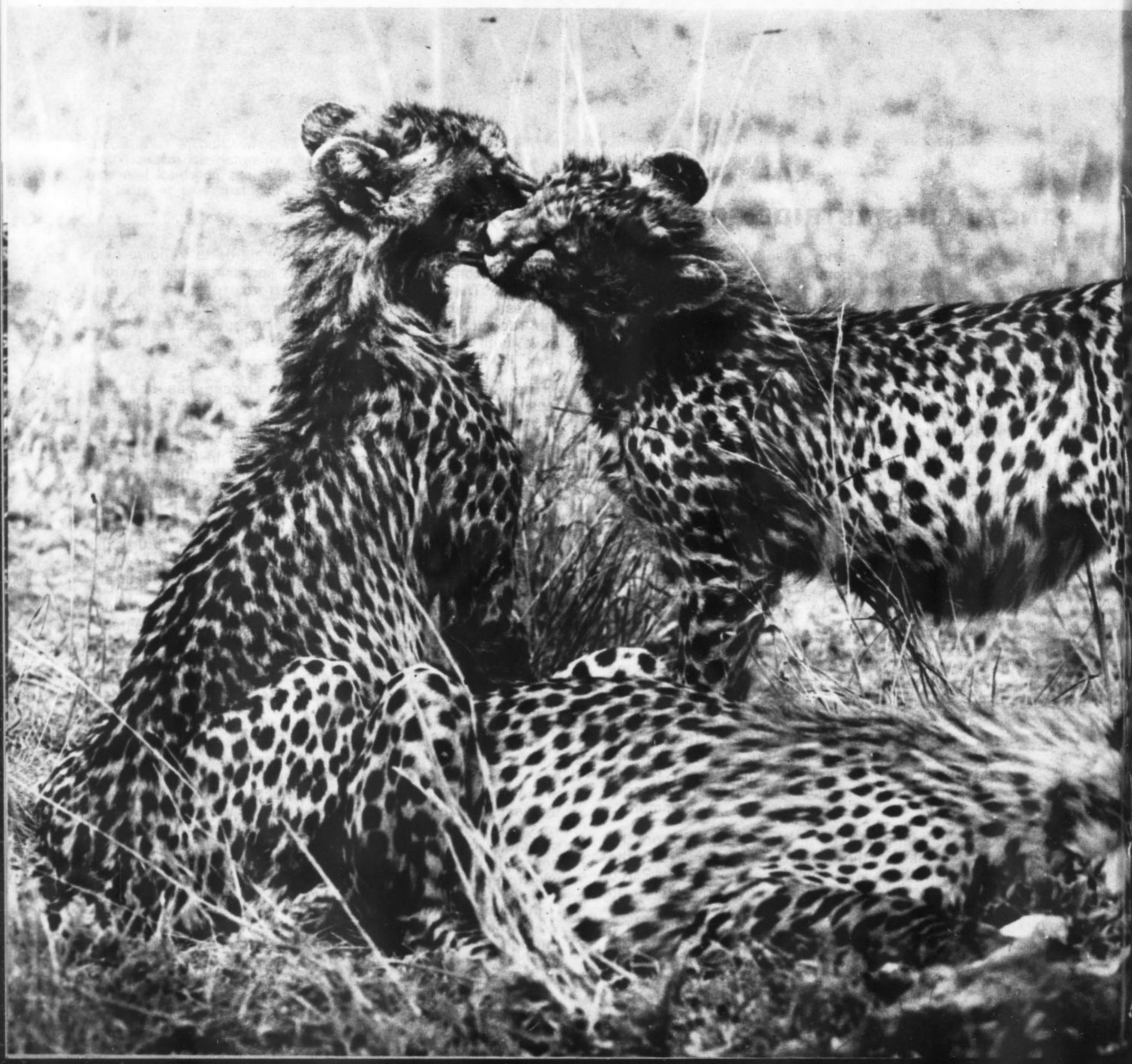
Champion sprinters of the animal world

The African cheetahs, or hunting leopards, in these remarkable close-up views look for all the world like a family party of domesticated cats. Cheetahs are easily tamed and have cat-like characteristics: they purr when stroked, climb trees and have the cat's tree-scratching habit. Their non-feline features are their long legs, blunt non-retractile claws and paws resembling a dog's. Weighing about 100 pounds, they can cover a quarter of a mile at an average of 45 m.p.h. and have been known to sprint for short distances at over 70 m.p.h. (the top racehorse speed ever recorded is 45 m.p.h.). In ancient Egypt they were used to hunt gazelles and hares (themselves top-rank sprinters) and in the 15th century it is reported that Armenia's kings kept hunting packs of over 100 cheetahs. Today cheetahs have become rare in Asia and are also disappearing in Africa; in the extreme south and north they have been completely exterminated. Hunting of the cheetah has now been generally prohibited or else is strictly controlled in Africa.



Photos © Myers, Nairobi



SANCTUARIES ASTRIDE FRONTIERS *(Cont'd)*

time created a reserve to cover the part of the forest on its side of the frontier. Hundreds of thousands of tourists each year now visit this wild region.

Next to Europe, tropical Africa contains the greatest number of protected zones lying astride neighbouring State frontiers. The most spectacular region in Africa is the area surrounding Lake Edward containing the Albert National Park and the Queen Elizabeth National Park situated in the Democratic Republic of Congo, in Rwanda and in Uganda. This area contains examples of almost all the natural surroundings of the Ethiopian region.

With an area of some 2 1/2 million acres, these two national parks include an astonishingly varied countryside such as the glaciers of Ruwenzori, the incandescent lava lake of Nyiragongo, the rain forests of the Ituri, the savannah land of the tree-euphorbia in the plains of Rwindi-Rutschuru and the country bordering the Kazinga Channel. Some of the most spectacular animal species live there, often in densely populated herds including mountain gorilla, chimpanzee, elephant, hippopotamus, forest and savannah buffalo, okapi, topis, water buck and Uganda cob. There are few areas in Africa where so much wild life can be seen in the course of a journey involving so few miles.

An area made up of the Serengeti National Park and the Mara Reserve situated further to the east and astride the frontier between the Republic of Tanzania and the Republic of Kenya also constitutes a unique ecological region but very different from the one just described. Livestock, including over a million zebra, wildebeest, Grant and Thomson gazelle, in addition to quite a considerable number of giraffe, black rhinoceros and, of course, carnivora (lion, cheetah, leopard, hyena, jackal and others) live in these immense plains and emigrate with the movement of the rainbelts.

A few miles away, the giant Ngorogoro Crater provides us with one of the natural wonders of the world (See Unesco Courier, Sept. 1961) while the Gorge of the Olduvai contains a unique sequence of fossilized deposits from Homo Habilis and Zinjanthorope to Homo Sapiens. Nowhere else on earth provides more data on the complex history of the emergence of man in the world.

The "W" National Park of the Niger (named after its W-shaped form) in West Africa, lying astride the three frontiers of Niger, Upper Volta and Dahomey is, to some extent a kind of western counterpart of the two spectacular regions of East Africa just described. Considerable herds of elephant, buffalo, hippopotamus, antelope and cob as well as the great carnivora are found there.

UGANDA-CONGO-RWANDA. Next to Europe tropical Africa has the greatest number of protected zones lying astride neighbouring frontiers. The most spectacular region is the area containing the Albert National Park and the Queen Elizabeth National Park situated in the Democratic Republic of the Congo, in Rwanda and in Uganda and surrounding Lake Edward where this photo of African marabou storks was taken. Thousands of marabous have been killed for the soft white coverts of the underwing and tail, used for trimming women's clothing.

Alain Gille

Unesco and nature conservation

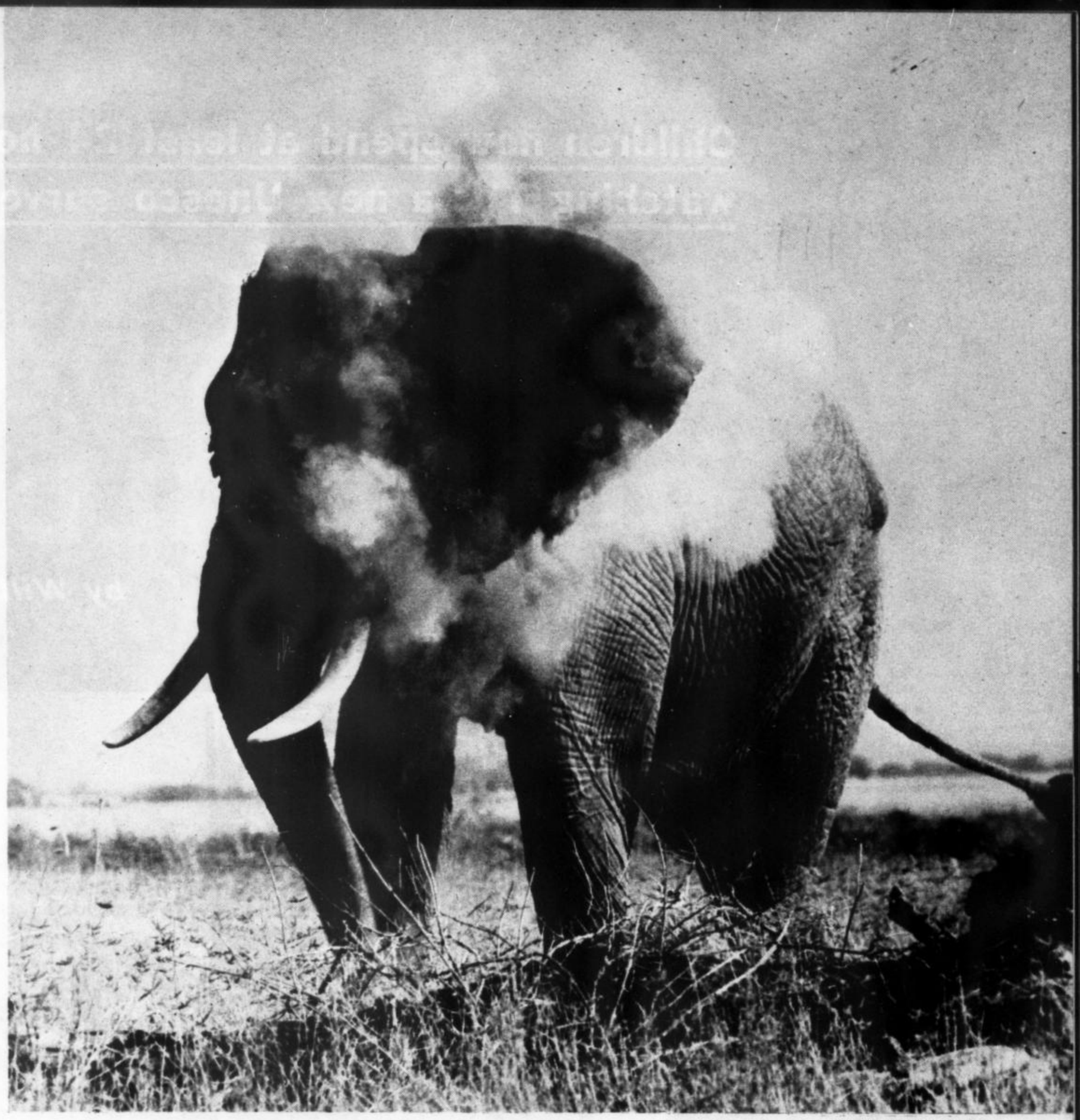
Problems concerning the conservation of the world's natural resources and particularly its wildlife have always been one of Unesco's major preoccupations. In this vast field it has collaborated closely with the U.N. Food and Agriculture and the International Union for Conservation of Nature and Natural Resources.

Important developments have taken place in Africa, in particular, following an international conference on the Conservation of Nature and Natural Resources in Modern African States, held at Arusha (Tanzania) in 1961. In 1963, a Unesco mission led by Sir Julian Huxley made an on-the-spot-investigation of nature conservation problems in Ethiopia. At Ethiopia's request Unesco has now sent three specialists to help the country carry out a conservation programme. A Unesco Regional Centre for Science and Technology, whose creation was decided by the recent Unesco General Conference, is now being set up in Nairobi (Kenya). One of its tasks will be to help African governments solve their conservation problems.

Asia's conservation problems will be discussed at an international conference to be held in Bangkok under Unesco's auspices later this year.

In Latin America, the Charles Darwin Station, an international laboratory equipped for important scientific research, was inaugurated in January 1964 in the Galapagos Islands—a zoological site with unique characteristics. Its creation came about through close and continued co-operation between Unesco, the International Union for Conservation of Nature and Natural Resources, the International Charles Darwin Foundation for the Galapagos Islands and the government of Ecuador.

The first international conference of world-wide scope aiming at the development of national parks and an increased understanding of the problems involved was held in July 1962 at Seattle (U.S.A.). Among other recommendations the conference proposed the creation of national marine parks; several such parks have now been set up and projects for others are being studied.



TANZANIA-KENYA. The largest of land animals, elephants have few enemies to fear except man. Until recently elephants ranged over the whole of tropical Africa from sea level to the forests of such snow-capped peaks as Kilimanjaro in East Africa. Because of unrestricted hunting to obtain their huge ivory tusks (record length 11ft. 5 inches) they have disappeared from a number of regions. In the past forty years elephant reserves have been set up and the elephant population has increased in certain areas. In Uganda, it was estimated at 23,500 head in 1959. Right, an elephant gives himself a dust bath in the Mara Reserve situated on the frontier between the Republics of Tanzania and Kenya.

© Myers, Nairobi

There are at present not many "protected zones" astride international frontiers in America. On the Canadian-United States frontier, the area made up of the Glacier National Park and Waterton National Park is an exception and it bears the propitious name, The International Peace Park. Species of the great temperate mountain fauna, from the giant grizzly bear to the white Rocky Mountain goat live here in a majestic setting of high mountain ranges. With a little patience and luck one can sometimes approach to within a few metres of the timid mountain goats.

Unfortunately, in Latin America the proportion of wild life has not reached the same stage of development as in other countries. There are, however, encouraging signs of future collaboration between people interested in wild life protection in the various countries. Brazil and Argentina have established two adjoining national parks around the famous Iguassu Falls with an area of 640,000 acres which will ensure the protection of not only the incomparable falls themselves but also the interesting forest fauna and flora of this part of the temperate tropics.

It is to be hoped that this first example of concern for wild life will be followed by others, particularly in the Republics of Venezuela, Colombia and Ecuador in the Andes Mountains. Here, the mountain forest areas and the strange paremos, or mountain plateaux, are deteriorating at an alarming rate.

We may wonder why national parks are not found well within countries rather than in frontier areas, which in fact facilitates the joint development and exploitation of potential wealth from the tourist trade and the natural resources in these frontier regions.

There are at least two reasons for this. Frontiers between States often correspond with natural barriers, particularly high mountain chains which have always been relatively underpopulated and where there is little agricultural and industrial development. It is, therefore, not surprising that natural vegetation and wild animal life should be better preserved in such economically marginal areas.

But this is not always the case. Sometimes nature takes advantage of man's hostility towards his neighbour. It is not difficult to find examples of countries where extensive forest and plain with their fauna, wet lands and islands owe their prolonged protection to the restrictions on movement by people as well as on land development imposed by military and customs regulations.

By a curious irony of fate, human antagonism has in this case served the cause of wild life. It is for generations to come to seize the opportunity of ensuring the continued existence of the countryside and natural monuments which owe their survival to their ancestors' mutual suspicion in times past.

FRANÇOIS BOURLIERE is President of the International Union for Conservation of Nature and Natural Resources. He is a professor at the Faculty of Medicine in Paris and also lectures on animal ecology at the Faculty of Sciences. Among many other works he has written a "Natural History of Mammals" (Harrap, London, 1955, 21/-; Knopf, New York, 1956, $ 5.00).

Children now spend at least 24 hours a week watching TV; a new Unesco survey examines

WHAT TV IS DOING TO OUR CHILDREN

by Wilbur Schramm

Unesco-Paul Almasy, Paris

Television has now become a world-wide force after developing in the past fifteen years more quickly than was ever expected. As it continues to spread at an amazing pace, entering more and more into the lives of people on every continent, what impact does it make, especially on the ideas and behaviour of children? During the past decade the spotlight of research has been seeking out some of the answers to this question. A guide to present knowledge on this subject, gathered and analyzed in many countries, has now been compiled and published by Unesco in the form of an international annotated bibliography, "The Effects of Television on Children and Adolescents", edited by Wilbur Schramm (No. 43 in Reports and Papers on Mass Communication; French and English versions; $1.00, 5/-, 3.50 F.) Below Professor Schramm sums up the results of the world-wide research carried out on this subject.

ESTIMATES from different countries indicate that the average child of elementary school and high school age (six to sixteen) devotes to television from twelve to twenty-four hours a week. Elementary school children spend, on the average, a little more time viewing than do high school students.

In the United States, where the most extensive measurements of viewing by children of different ages have been made, it is estimated that a child of three is already averaging about forty-five minutes a day on television. By the time, the child is in the first grade (age five or six), he is spending about two hours a day in front of the television set. The time spent watching TV slowly increases with age and with later bedtimes, until a peak is reached at the age of twelve or thirteen when the average child is viewing about three hours a day. During the high school years (thirteen to sixteen), the viewing time decreases to about two hours a day.

This curve is consistent with other evidence on the subject, and the daily averages are not unlike those found in England or Japan. In England, it was found that children ten to eleven and thirteen to fourteen years old averaged about 1.9 hours a day, which is a little less than the American average for those ages. This may be because less television and fewer station choices are available in England. German youth, fifteen to twenty years old, averaged only seven to eight hours a week, or barely over an hour a day. Its is not known whether this is a result of less television being available in Germany or of the age group selected or because there is a real difference in television's attractiveness to young people of different countries.

WHEREVER television becomes available for a number of hours a day it dominates the leisure time of children. Hilde Himmelweit, A.N. Oppenheim and Pamela Vince in "Television and the Child," based on studies made in England, have suggested several principles that help to explain the changes television brings about in leisure patterns. The activities most readily sacrificed are those which satisfy the same needs as television, but less effectively.

For example, younger children will go less often to the cinema when they have television in their homes; they will read fewer comic books, and read less magazine fiction; they will spend less time on radio. These activities meet about the same needs as television. But the reading of newspapers and non-fiction books will hardly be affected by television because these activities answer different needs than does television. Similarly, the adolescent's cinema-going will be less affected than will the younger child's, because for the adolescent the cinema represents a valued social experience, whereas for the younger child it represents television in a theatre.

THE impressive figure that emerges from the studies of television and leisure time is the enormous amount of time devoted to T.V. during childhood. An average child six to sixteen years old in any of the countries where more than a few hours of television is available and where children's viewing time has been measured in detail, can be counted on to spend between 500 and 1,000 hours a year in front of the picture tube. This is a total of 6,000 to 12,000 hours during the twelve school years. The larger of these figures is not far different from the amount of time an average child spends in school during those same years, taking into account vacations and holidays.

Effect on Taste. Because children spend so much time on television, chiefly on programmes not noted for their cultural content, critics have wondered whether television "demeans" children's taste for entertainment. The research carried out has some interesting things to say on the subject.

When children begin at an early age to watch television, they usually start with children's programmes—puppets, animals, story-telling, children's songs, and so forth. Very soon, however, they discover adult programmes, and come to prefer them. Above all, they prefer the more violent type of adult programme including the western, the adventure programme, and crime drama. The result is that, even in the early elementary school years, they view more adult programmes than children's programmes. This preference for adult programmes has been reported from every country where a choice is available and where children's viewing has been studied. In the United States, it has been noted that as much as two-thirds of children's viewing was of programmes in which adults make up the majority of the audience.

Children's taste patterns are fairly well structured by the age of ten or eleven. A child who likes a given kind of

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Confusing worlds of fantasy and reality

programme on television will be likely to enjoy corresponding material in popular magazines or in films.

The question has been raised whether children "see what they like," or "like what they see." In other words, do they come to enjoy violent programmes because no very attractive alternatives are available or do the more violent programmes fill so much of the air time because children do not like programmes which critics would say are at a higher "cultural level"? This question is by no means settled, but the research does contain at least one interesting finding relating to it.

Dr. Himmelweit and her colleagues found that when only one channel was available in England, and children had only the choice of ceasing to view or viewing a programme which they did not expect to find very interesting, they often chose to see that programme and became interested in it. Thus their tastes broaden and may be raised in average level. However, when choices are available, children tend to choose the type of programme which they have previously found interesting and thus their tastes are hardened and narrowed.

Learning from Television. Abundant evidence has now accumulated that a good teacher can teach effectively by television, though no one contends that all the useful activities of education can be carried on by television.

There is real hope that instructional television may "enrich" many classes, that it may furnish expert teaching in fields where few experts are available (in the teaching of foreign languages in elementary school), that it may add new strength to home and extension teaching, and that it may be useful in some of the developing countries where teachers are in short supply.

Does home television cause a student to do better work in school? This is a hard question to answer. But there is little evidence that television helps children's school performance or that children's grades are poorer when they have television at home. Lower grades go with heavy viewing but the viewing is not necessarily the basic cause of the poor performance. The observation of most students of children's television behaviour is that heavy viewing tends to be a symptom of stresses or frustration or unsatisfactory human relationships. The same stresses or unsatisfactory relationships might also reduce a child's efficiency in school, and the frustration of failing to do good work in school might result in heavier viewing.

MOST of the debate, however, has centred not on the effect of television on school grades or on the effectiveness of instructional television, but rather on the incidental learning which children derive from the two hours or more a day they spend on entertainment television. Does television broaden their horizons? Does it teach them skills—desirable or undesirable? Does it give them a distorted view of the adult world?

The general conclusion, as summed up by Dr. Himmelweit recently in a statement concerning the British film inquiry, is disappointment that television does not teach children more than it does. "Surely a medium with such possibilities as television should be able to do more," she writes. "We should by now be able to point with pride to a younger generation more curious, better informed, more enterprising through having been able to offer them a window to the world. What is wrong? It seems to me a devastating indictment that while ten-year-olds still pick up some knowledge from television, by the time they reach thirteen only the dull ones do so, and that the television hold becomes less the more intelligent the child. . . It must give even more cause for reflection to realize that these children view almost exclusively programmes designed for family and adult entertainment. Is it perhaps that much of the evening's entertainment is at the level of a ten to eleven-year-old?"

Children's television programmes often present themes and stories which have attained well-established popularity through books and the cinema. Youngsters welcome a reunion with familiar characters. In the case of French children these include the mariners who figured in a television programme based on Jules Verne's well-known book. "The Mysterious Island" (right). To cater for the child's taste for fantasy there is no lack of charming and humorous programmes spiced with music and poetry. Far right, a shot from a Polish programme, "Peter and the Wolf", based on Prokofiev's Music.

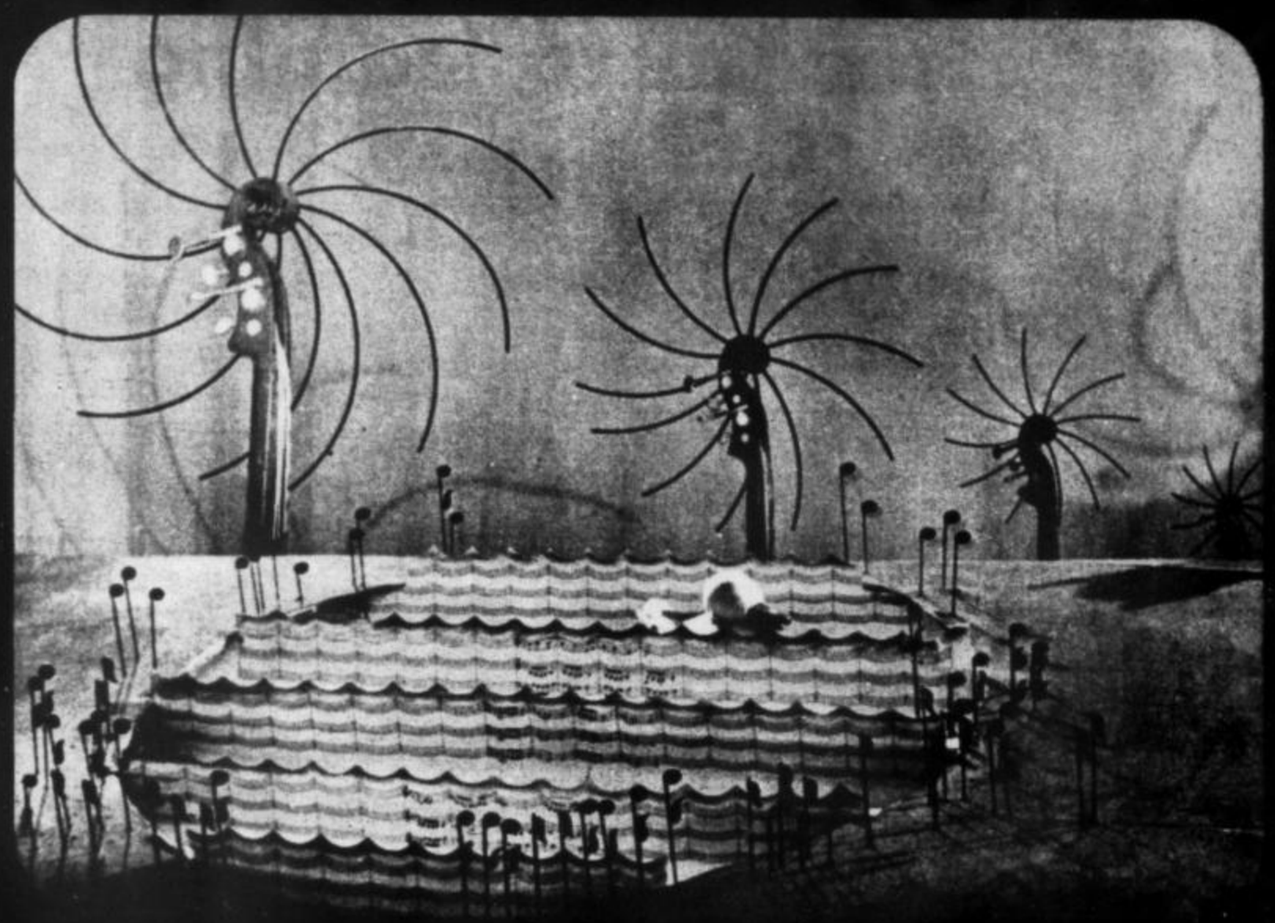
ORTF, France

It was found in Canada that children in a television town came to the first grade of school with vocabularies about a year more advanced than children in a town without television. Half a dozen years later, however, the differences had disappeared, and the children with television knew actually **less** about public affairs although **more** about entertainment matters) than the children without television. Here, as in other studies, it was found that in the early school years the bright children seem to learn more from television whereas after age twelve or thirteen the slower children seem to use television more and gain more from it while the brighter ones depend more and more on print. However, there is also some evidence that parents and teachers think the level of general knowledge is increased by television.

Studies of television content, of course, vary in their results from country to country but many of them point out that television brings a child face to face with adult problems long before he ordinarily would meet them, and in some countries this tends to give him a view of adult life that is distorted in terms of social class, desirable occupations and violent ways of solving problems. To what extent this television world view becomes a child's real world view, affects his plans and expectations and preparations, and controls his behaviour as an adult is not yet fully known.

When Does Television Affect a Child's Outlook and Values? Television has its maximum psychological effect on children, according to one of the ablest writers on the subject, when the values or viewpoints recur from programme to programme ; the values are presented in dramatic form so that they evoke emotional reactions; they link with the child's immediate needs and interests; the viewer tends to be uncritical of and attached to, the medium; and when a viewer, through his friends, parents, or immediate environment, is not already supplied with a set of values which would provide a standard against which to assess the view offered on television.

Thus, in order to predict the effect of television one



Polish Television

must know something about the television and something about the child. A child with high aggression will probably make special use of the aggressive materials he finds in a television programme. Many children may learn from a television crime programme how a holdup is committed, but only a few children—for example, some who have psychopathic tendencies or have fallen under the influence of a criminal gang—are likely ever to make use of this information. For most children, television is a pleasing experience, a relaxation of tensions and relief from pressing problems; but to some it is a confusing experience because they are unable entirely to separate the fantasy world of television from the real world. Thus the same television programme will not have the same effect on all children any more than will the same child derive the same effect from all programmes.

But there is one element in the relation of child to programme which seems rather more important than any of the others in determining what effect the programme has. This is the extent to which the child can identify with one or more of the characters in a programme.

Television and Delinquency. Most students of television effects on children are unwilling to say that identification or incidental learning from television plays any large part in causing delinquency or crime. The roots of this criminal behaviour lie far deeper than television; they reach into the personality, the family experience, the relationships with others in the same age group as the delinquent or criminal individual. At most, television can be merely a contributory cause, and is likely to affect only the child who is already maladjusted and delinquency-prone.

Television may contribute by teaching a criminal skill which may be used when the individual decides to commit a crime. It may trigger off an act of delinquency by feeding a child's aggressive nature. Or it may encourage delinquent behaviour by implanting an unreal idea of the importance of violent behaviour in solving human problems. But in any of these cases television by itself cannot make a normal, well-adjusted child into a delinquent. This is the almost unanimous conclusion of research and clinical investigation.

The Effect of Violence. Because so much of the entertainment a child sees on television is violent, special attention has been paid by researchers to the possible effect of all this violence. The original hypothesis was that television violence might serve as a safety valve, by means of which a child might rid himself vicariously of pent-up aggressions. However, a series of experiments have now come out with exactly the opposite result.

The typical method used in such experiments is to frustate a group of children so that they develop a high level of aggression. Then they are shown a film or a television recording of a drama in which aggressive behaviour plays a prominent part. (In different experiments, the ending, the type of aggression, the nature of the character, and other elements of the story are varied.) A similar group of children, who have not been frustrated, are shown the same programme. Then, the members of the two groups are given chances to express any aggression they may have—either by behaviour or in tests of some type.

Invariably, there has been a great difference between the experimental and the control group. The children who were not frustrated (the control group) seem no more aggressive than they were before seeing the picture. But the children who were initially frustrated (the experimental group) have not reduced their aggression; if anything, they have built it up. They have in many cases found ways to express it.

WE know that children with high levels of aggression are especially attracted to violent programmes on television. If television now feeds rather than reduces children's aggressive tendencies and if it gives them hints as to how to take out aggression with fists, knives, or guns, then an opportunity may come to use those weapons at a moment when they are angry. We assume this does not happen often because social norms teach them not to behave in such a way. But certainly there is little to make us believe that violent programmes on television **reduce** the likelihood of violence in real life.

Suppose an aggressive child regularly identifies with a hero who himself uses violence to solve problems. For example, French investigators found that delinquent boys were very fond of a certain film hero who "fights. . . knows how to treat women. . . overcomes all obstacles . . .respects no moral code and frequently plays an ambiguous role; one can never tell whether he is on the side of the police or the side of the gangsters." Analysing the reactions of

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From escapism to learning

the boys they were studying, they concluded that such a mass media experience as this is especially dangerous for juvenile delinquents or potential delinquents.

On the whole, the weight of the evidence is behind one researcher's conclusion that "the heavy dosage of violence in the mass media," although not a major determinant of crime or delinquency, "heightens the probability that someone in the audience will behave aggressively in a later situation."

Television and Maladjustment. One of the most important topics in the literature of television research is the relation of television experience to a child's social adjustment and his mental health. This has not yet been adequately examined because of the scarcity of clinical studies, and only tentative conclusions are possible.

There is ample evidence, however, that television sometimes frightens children, and of what kind of material is most frightening. But children often like to be frightened (witness the popularity of the roller-coaster!). And no scholar contends that television is likely to have a harmful effect on the social adjustment or the mental health of a child who enjoys warm and solid relationships at home and with his friends and who has no foundation of mental illness.

For this reason, parents have been advised that the greatest defence they can raise against possible ill effects of television is to make their children feel loved and secure at home, and to help them to satisfactory relationships with friends of their own age. And so far as fright is concerned, parents can help their children to avoid programmes that are too frightening.

Dr. Lawrence Z. Freedman, a psychiatrist, points out that most children in a reasonably stable environment, do not confuse the make-believe world of television with the real experiences of personal and family relationships. "Most youngsters find the immediate personal relationships more compelling and rewarding than the animated, pictorial substitutes," he says. ". . . The intensity and psychic significance of the child's response to television is the reciprocal of the satisfaction he gains in the milieu of his family, school, and friends. One would predict that the less intelligent, the most disturbed youngsters, and those having the poorest relationships with their families and peers would be most likely to immerse themselves in televiewing as escape and stimulus."

DOES television make children passive and withdrawn? There is no proof that it does, although television clearly may contribute to passivity and withdrawal when there is already a tendency present. As Dr. Freedman points out, "when the automobile removed youngsters from the surveillance of their homes, we were concerned for their morals. Now television immobilizes them in the living room and we deplore their passivity." Nor is there any real evidence that television is good or bad for home life. It keeps children more often at home. But watching television in a group does not seem to make for a really strong group relationship; each member of the family reacts individually, more often than as part of a group, to the television he sees. The conclusion is that television is not likely either to ruin a healthy home relationship or rescue an unhealthy one. And a reasonable corollary is that the quality of a child's social relationships is more likely to control his use of television, than vice versa.

In general, the evidence on physical effects is negative. Television postpones average bedtimes a few minutes, but seems to decrease sleeping time very little because children who have stayed up later appear to go to sleep more quickly. It is true that there are reports of children who are frightened by evening television and unable to go to sleep, and of children who are sleepy in school because they have stayed up late at night to see a programme, but none of the studies can find any evidence of widespread fatigue or other physical effect related to television. Indeed, there is some reason to think that standards of behaviour set by the parents may have more to do than television with late bedtimes, and that if these same homes did not have television the children might still stay up late for other purposes.

Nor is there any evidence that television, viewed properly, has a bad effect on children's eyesight. Some specialists say that reading is as likely as viewing to cause eyestrain, and others that viewing is good "exercise" for the eyes. In general ophthalmologists advise children to view television in a room where the television receiver is not the only source of light, not to sit closer than six feet from the screen and to sit with the screen at approximately eye level. (The British ophthalmologists say, "eye level or slightly below"; the Polish say, "eye level, or a bit higher.") Even eye weariness resulting from protracted and improper viewing can be overcome in a short period of rest, a Japanese study found.

WE are now rich in surveys, and except where a country which has not had a large survey wants a broad picture of the television behaviour of its children in order to see how their behaviour is different from that revealed by other surveys, there seems less need now for survey than for experiment. Perhaps the most obvious need is for additional close experimental and clinical studies of the effect which a given kind of television has on a given kind of child. It may be a long time before close, careful studies like these answer all the questions posed, by the effect of television on children, but without such studies we shall never be able to say clearly and sharply what are measuring and where our results apply. Whenever possible these studies should be extended over a period of years, so that we may begin to understand the cumulative effects of television.

Another aspect of television which deserves more attention is the problem of how to realize the potential of the medium. Some disappointment has been expressed at the fact that television has not completely fulfilled its potential as a window on the world, that it has not given us a better informed and more enquiring generation, and that is has merely provided the average child with two to three hours of daily entertainment.

Perhaps now we should study how to make the non-entertainment, non-fictional programmes on television more interesting, so that they will attract their share of viewers and contribute their share of learning. And perhaps we need to study how taste is formed, so that instead of narrowing our children's taste around a certain level of entertainment we can broaden their television interest and encourage them to use television when possible as a window on the world rather than as a momentary escape from the stresses of growing up.

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RICHES OF CROESUS. A silver shekel (.6 in.) struck about 550 B.C. during the reign of a monarch famed for his wealth, King Croesus of Lydia (Asia Minor). The heads of lions and bulls are motifs that can be traced back to Sumerian times when they were used on the seals of ancient Babylon. Gyges, founder of the Lydian dynasty, is credited with the invention of coins for use as State currency.
Photos © O.P Wenger, Bern

KNIFE-MONEY. A knife-shaped Chinese copper coin (5.3 in.) dating from the 4th century B.C. In ancient China arms and knives were often used for trade and barter and eventually miniature replicas replaced them as coinage.

AMBASSADORS OF ART AND HISTORY

by Otto Paul Wenger

BEFORE man invented coins barter was the prevailing form of trade. Evidence of some measure of barter over very great distances can be found as far back as the Old Stone Age. Flint, for example, which at that time was in very great demand, was exchanged between Northern France and Southern Germany. Barter was subsequently extended to ornaments and implements (flint weapons, amber ornaments), and, when the use of metals began, copper, tin, bronze and gold became important items of trade.

The great rivers already served as trade routes, as in the case of the amber route. In Ancient Rome, on the other hand, in the fifth century B.C., cattle were still the most important measure of value. The original name for cattle in Latin was "pecus", whence "pecunia", and, in Homer's writings, the ox was still the standard of value: Menelaus's armour is worth nine oxen, while Glaucus's is worth as many as one hundred.

The increasingly brisk trade across the frontiers of individual towns and states made it necessary, however, to adopt a common measure of value. Herein lies the great significance of money and consequently of coins. Money, however, does not always consist of coins. Cowrie shells, which were

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already known as a means of payment in East Asia as early as 1300 B.C. or thereabouts, still circulated until quite recently as money in Africa. The large perforated limestone disks, which played an important rôle as a medium of exchange on the South Sea Island of Yap, are well-known.

In the nineteenth century, tea pressed into brick from (tea-brick money) was used as currency in Tibet, and in the second century B.C., spades, knives and other implements were used for payment in China, which was then already highly civilized. At the end of the Shang dynasty (about 1.200 B.C.), these working implements were replaced as a means of payment by small replicas made from the same metal. They were not, however, true coins such as those used today.

To whom, then, do we really owe the invention of coinage, which was to have such important consequences?

GREEK writers have left us reliable accounts of the invention of coined money. The historian Herodotus and the philosopher Xenophanes, who were both born in Asia Minor, ascribe the invention of coinage to the Lydians. The latter were the dominant power in Asia Minor in the seventh, and the first half of the sixth, century B.C. Gyges, the founder of the Lydian dynasty (687-652 B.C.), may be considered to be the real "inventor" of coin money.

The first coins were made of electrum, a natural compound of gold and silver, found in the Lydian rivers. At first, they were plain, nugget-like objects bearing no image. It was only later on that an image was stamped on coins, but, at the beginning, only on the obverse; the reverse showed one or two impressed squares produced by the punch with which they were struck.

A little later, on the island of Aegina, the first silver coins were minted, and shortly afterwards the first coins of the rich seaport of Corinth and the first Athenian coins appeared. In 593 B.C., Solon, the founder of the Attic political constitution, reorganized the coinage system and minted the first large silver coins of four drachmas (tetradrachma). For the first time, these coins had images on both sides. While the Aegina coins were stamped with a rough representation of a turtle, the Corinthian coins bore a winged horse and the Attic coins were adorned with an owl. In ancient times, the Aegina coins were known as "turtles", the Corinthian coins as "fillies" or "foals", and the Attic coins as "owls". The coins of these three towns were widely current.

The noble art of coining spread with astonishing rapidity in Greece in the sixth century B.C., and from there it reached the West about 550 B.C.

Two centuries after their invention,

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1 SMILING GODDESS. Athena, helmeted and wearing a string of pearls, appears on this silver Corinthian coin (.78 in.) minted about 480 B.C. Athena was the Greek goddess of wisdom and protectress of the arts, sciences and industry.

2 HUMAN-HEADED BULL. Half-man, half-animal, this river-divinity was revered by the people of Gela, an ancient Sicilian city where this silver coin of four drachmas (.95 in.) was minted about 425 B.C.

3 CAPTIVE LEADER. The expressive portrait on this silver denarius (.47 in.) is the work of a Roman engraver, L. Hostilius Saserna (about 45 B.C.). With its air of resignation and its cheeks hollowed by suffering, the face is probably that of Vercingetorix, leader of the Gauls, who, after his capture by the Romans at the battle of Alesia, was taken to grace Caesar's triumph in Rome in 46 B.C.

4 ATHENIAN OWL. For several centuries Attic coins bore the figure of the owl, symbol of Athena, the patron goddess of Athens. An olive branch, symbol of peace, and a crescent moon also figure on this silver piece of four drachmas (1 in.) dating from about 430 B.C.

5 MOTHER AND SON. The effigies on this gold coin, a handsome example of the engraver's skill, (.78 in.) are those of the Byzantine emperor Michael III (839-867 A.D.) and his mother, Theodora. The emperor, known as "Michael the Drunkard", was assassinated by Basil of Macedonia who became emperor in his place.

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BARLEY EAR AND GRASSHOPPER. Metapontum, a Greek colony in Italy, used an ear of barley—the source of its wealth—to identify its coins. A variety of subsidiary symbols appear on its coinage including such animals as the grasshopper (shown here) lizard, owl, mouse and others.

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Precursors of the newspaper

coins were already being widely used throughout the Greek world. They promoted trade by land and sea; they enabled the citizen to amass money for himself. When, later on, the Persians made the gold daric the basis of a single uniform currency for their whole great empire, and when the practices of interest accounting, pledging, procuration and security were taken over from Babylon, all the conditions for world trade as we know it today were established.

The dies were carved by hand and the coins themselves were stamped by hand on an anvil. The Greek artist's genius made the coin a work of art. No coin was identical with another, and no other people in the world has ennobled "money" as a product of artistic skill, to the same extent as the ancient Greeks.

The representations stamped on the coins were extremely varied. First came representations of the gods in all their shapes and forms; there is also a striking variety of animals and plants. The image of a living person appeared on coins for the first time in Europe during the reign of Demetrius Poliorcetes of Macedonia (306-283 B.C.).

Greek coins finally penetrated deep into India, but Greek power was visibly declining. Rome was rearing its head. The images of indigenous gods and rulers were replaced by portraits of proud Roman emperors.

It was only in the fourth century B.C. —when the Greek art of coining was at its height—that the formless lumps of bronze used as money by the Romans were shaped and marked to become a state coinage. The first coins, however, were cast and not struck. The actual minting of Roman silver coins did not begin until about 269 B.C. The basic unit was the silver denarius. In the year 44 B.C., the Senate conferred on Caius Julius Caesar the right to have his head portrayed on coins. This was the first time that the image of a living person had appeared on Roman money.

Under the Emperor Augustus, the line of development which was to make Roman money a pattern for all future currencies was started. The Emperor's head thenceforth adorned the obverse of coins, while the reserve was used for State propaganda. At that time there was no press, radio or television and so coins became the "common man's newspaper". Domestic and foreign political events were commemorated. The worship of the gods, social policy and architecture were all recorded on coins in pictures and words.

THE minting of gold and silver coins was the prerogative of the Emperor himself, whereas the Senate had a certain say in the minting of bronze—hence the two letters S.C. (Senatus Consulto) imprinted on copper coins. The imperial coins minted during the first two centuries A.D. are of surpassing beauty. This is particularly true of the large bronze coins, the sesterces. The magical effect of the patina gives them the lustre of rare jewels.

Rome's rule lasted for many centuries, but in the latter days of the Roman Empire coin design became steadily flatter and sketchier, and it is not always possible to recognize the effigy of the ruler. The slow decline of the Roman Empire was accompanied by the decline of the coinage in general. It was a long time before the unmistakable Buzantine style left its mark on the imperial coins. The Byzantine coins are simple, austere and highly stylized.

Like every other art, coining has its seasons of greatness and its periods of decline. The art of coining in the early middle ages cannot compare with that of classical antiquity. The northern peoples can show nothing to rival the peerless mastery of the ancients in all branches of the visual arts.

From the end of the seventh century on, Charlemagne's mint regulations provided the standard for the greater part of Europe. The most important coin was the denarius or penny. But even then the coinage steadily deteriorated. The right of coinage was the prerogative of the king, who ceded it for money to margraves, palsgraves, abbots and bishops. Almost all those who enjoyed the right of coinage tried to derive the maximum profit from their prerogative.

In the middle of the twelfth century, the penny became so thin that it was no longer possible to make a clear stamp on both sides. In those times of need, the mint masters remembered the ancient technique of hollow stamping which had never died out. The new one-sided pennies were called bracteates. For those who enjoyed the prerogative of coining, they represented a productive source of revenue. They were often called in within a year of issue, and nine new coins were exchanged for twelve old.

Shortly after the death of Frederick II, the powerful city of Florence minted its own gold coins, florins, bearing the city's lily escutcheon. Venice followed suit in 1284 with its ducats. The Gothic style then made its appearance. The Gothic gold coins are magnificent, particularly the English noble, which was coined for the first time by Edward III to commemorate his

naval victory over the French off Sluis (July 12, 1340).

With the Renaissance came larger silver coins. In 1486, the world's first thalers were coined at Hall in the Tyrol. At that time, they were still known as "Guldengroschen". Later developments, by way of Saxony and the silver-mine of the Counts von Schlick in Joachimethal (Bohemia), led finally to their being known as "Taler" (thaler). This great silver coin conquered the whole world. In Scandinavia it became the "rigsdaler"; the English took it over as the "crown", the French as the "ecu", the Italians as the "tallero", the Spaniards as the "peso", the Russians as the "rouble" and finally the Americans as the "dollar". At the end of the eighteenth century, this extremely popular silver coin also reached the Far East.

Coins have gone through all the stages in the evolution of culture: rise, apogee, decline.

All peoples have coined money, and confidence in coinage and, consequently, in currency has become a question of confidence between the peoples. Money appears most strikingly as a link between peoples in the tourist trade.

Whereas, in ancient times, in the middle ages and at the beginning of the modern era, trade necessitated the transport of money with a heavily armed escort, today it is generally carried through by book transfers and bank transactions instead of transfers of specie.

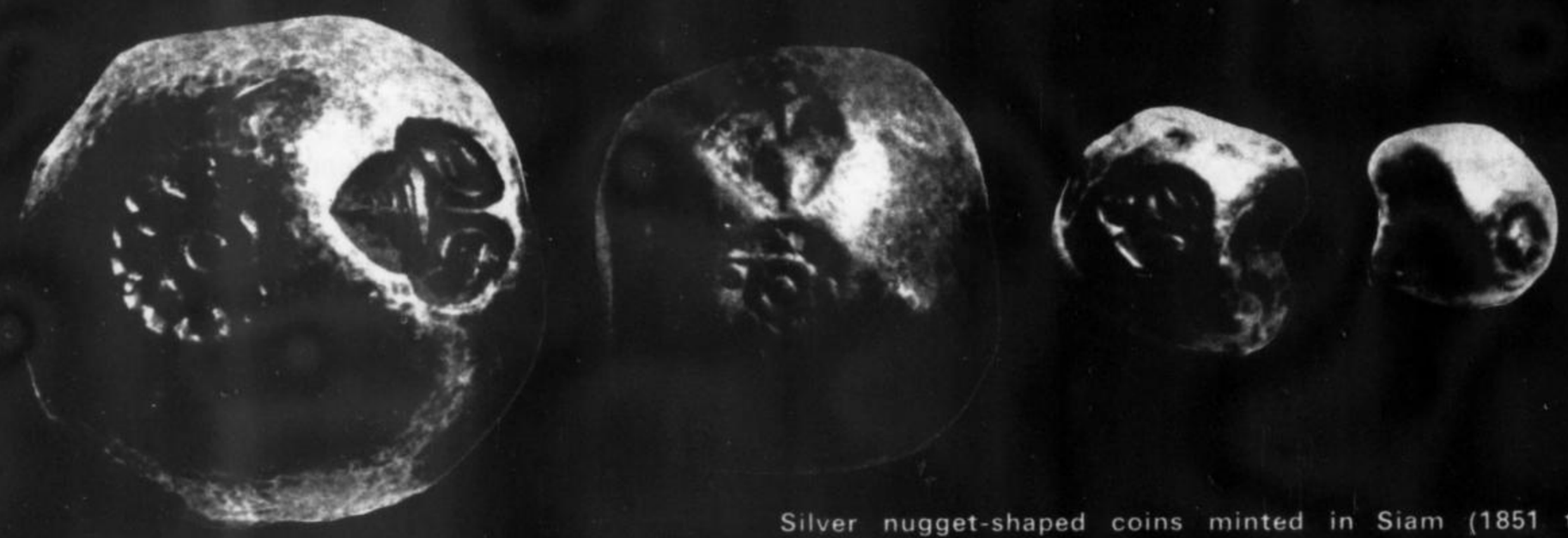
Money as such, it is true, no longer appears as a link between peoples except to a minor extent. This applies particularly to coins, i.e. "hard cash"—though few currencies today can claim to be designated "hard"! Nevertheless, it is impossible to imagine present-day international relations without money to fulfil its function as an internationally recognized measure of value.

Money may even be said to play a certain part as a means of transmitting information, in so far as coins, and now more particularly bank-notes, are representative of national pride: great figures in the history and culture of a nation, scenes and symbols of national life, or even of humanity transcending national bounds (as the guiding principles of peoples) are set before other nations by means of the coining press or the bank-note printing press.

OTTO PAUL WENGER is a member of the Swiss Numismatic Society. He has written many studies on coins, including "Kleine Münzkunde" (A Pocket Handbook on Coins) published recently by Hallwag, Bern, Switzerland.

Cut out in oval shapes from thin sheets of gold, Japanese coins of the 19th century are stamped with different marks and may bear a mint-master's name. Above, gold piece (1.4 in by .78 in.) dating from 1860.

HOLLOW PENNY. When a metal shortage occurred in the 12th century in Europe, the penny became so thin that it could only be stamped on one side. Mint masters used the old technique of hollow stamping to produce coins like this "bracteate" (as these hollow pieces were known) engraved in . Halberstadt (Germany) by Gero von Schrembke (1170). It depicts the stoning of St. Stephen whose portrait is held by angels.



Silver nugget-shaped coins minted in Siam (1851 to 1868).

Words under a mask *(Cont'd from page 12)*

● Let us become more suspicious of our own "wisdom." Anatole France once said of a man, "He flattered himself on being a man without prejudices; and this pretension itself is a very great prejudice." In "The Devil's Advocate: A Plea for Superstition," written in 1909, Sir James G. Frazer argued that so-called superstitions more often than not embody a realistic distillation of experience whereby the unitiated and unwary may receive tested guidance. Behind many "myths" are "truths" which have helped people to rationalize and maintain social order and organization.

Thus, for example, a "superstition" long held in some local area that a certain marsh is "haunted" may seem ridiculous at first but it may be a shorthand way of saying that the number of people who enter it and the number who emerge continually shows a marked discrepancy. Until the cause of deaths in the marsh—possibly malaria—is identified and dealt with, the local "respect" for the area is based on more than mere superstition.

Of course, much of what has been pointed out here will not come as a revelation. None of the ideas are new and, under different names, many of the General Semantics techniques have been used by intelligent people who have never heard of the word "semantics", let alone been exposed to the writings of Korzybski and others.

So much the better. Our concern is not so much with how people distinguish between a "map" and the physical territory which it describes, but that they do distinguish. George Orwell writes, "What is above all needed is to let the meaning choose the word, and not the other way about... Probably it is better to put off using words as long as possible and get one's meaning as clear as one can through pictures and sensations."

No one is suggesting that all abstractions be distrusted. "In demanding that people cease reacting to abstract names as if they were realities-in-themselves," says S. I. Hayakawa, "we are merely saying in another way, 'Stop acting like suckers'." And until we do give more disciplined attention to words, we will continue to stockpile symbols and labels while the "precious commodities" which are being symbolized and labeled escape our detection and comprehension. The argument-ending gambit, "It is only a matter of semantics" must give way to the more sophisticated recognition that the "real" search for "meaning" often starts where words leave off.

SEYMOUR FERSH is Education Director of the Asia Society in New York City. A former secondary school and college teacher, he went to India as a Fulbright professor in 1958-59. He is the author of "The View from the White House: A Study of Presidential Addresses to Congress" ,and of textbooks on India, his latest being "The Story of India", published by McCormick-Mathers Publishing Company Inc., Wichita, Kansas (1964), price 84 cents.

Science and the common man *(Cont'd from page 8)*

sophisticated brethren—or sometimes the terms are relics of a convenient analogy at the descriptive phase of a subject.

For example, we know how the word "fission" came into nuclear physics. Hahn and Strassmann found that when they bombarded uranium with neutrons the element broke up into two portions of roughly similar mass. The result was reported to their colleague Lise Meitner, then a refugee in Stockholm. Her nephew, Otto Frisch, later Jacksonian Professor at the Cavendish Laboratory, Cambridge, was visiting her.

They discussed the implication and agreed that the likely explanation was that the absorption of a neutron had disturbed the balance between the forces of attraction and repulsion within the nucleus of the uranium atom. It was as though the nucleus had become elongated and had developed a waist before dividing into two. This seemed to Frisch to be similar to the way living cells divide. When he got back to Copenhagen, where he was then working in Niels Bohr's institute, he consulted a biological colleague and asked him what the biological term was and was told "fission." This expropriation is still appropriate.

Exact scientists invented the term "atomic pile" and then they themselves complained that it was inaccurate; it was not "atomic," it was "nuclear;" and it was not a "pile," it was a "reactor." Actually, in the squash court at Stagg Field, of the University of Chicago, where Fermi built it, it was called a "pile" because its significance was known to very few and to most people it was just a heap of graphite blocks and uranium metal. But the term was a nuisance. We got stuck with "atomic pile." As science editor of the London "News Chronicle," I spent nearly three years converting the readers by writing "atomic pile (nuclear reactor)" and, gradually, "nuclear reactor (atomic pile)."

The most grotesque examples of misunderstandings and misrepresentation of scientific facts are to be found in the field of atomic energy. With the release of atomic energy, man created his own elemental gods. Forces like the thunder, and the lightning, which our primitive ancestors sought to appease, have been replaced by the Unseen, the Unheard, the Unstated, the Unsmelt, the Unfelt, the Unknown and the All-Pervading—by the radiations which have broken from the nucleus. This has created a new superstition. That superstition, like the elemental gods, is radioactive.

The fact that these new elements were arrived at by the exercise of reason and can be rationally measured and comprehended by the scientists is of little consolation to those who do not understand the ways of science, and who, in ignorance, instinctively regard science as meddling with things which would better left alone. This is irrational and deplorable but it is the ambiance of ignorance which must be recognized in any discussion of the problems of atomic energy.

In October 1957, the World Health Organization (WHO) called together a group, of which I was a member, to study the mental health aspects of the peaceful uses of atomic energy. This group had at its disposal the reports of many investigators in many parts of the world, not only in the more sophisticated societies but also among the people in the less-developed countries remote from newspaper headlines or nuclear text-books.

The findings of this WHO study group were superficial but, even so, very disquieting. The disturbing features became plain. One was the universal disquiet about atomic energy, not only of its potentialities for destruction in a nuclear war, but even of its peacetime applications. The group began to realize that the crust of our vaunted civilization was only egg-shell thick, and that, confronted with the release of immeasurable power from the infinitesimally small atom, civilized man tends to cower, like his Neanderthal forefathers, in the dark caves of his own emotions. We were back in the "childhood of mankind."

(TO BE CONTINUED)

RITCHIE CALDER has been professor of international relations at the University of Edinburgh since 1961. Winner of the Unesco Kalinga Science Prize (1961), he is well known to readers of The Unesco Courier for the many articles we have published in past issues. His article on Science and the Common Man will be continued in our next issue. It is condensed from the Unesco publication, "Impact of Science and Society", Vol. XIV (1964) N° 3. For further details of this quarterly review and subscription rates see inside back cover,

Letters to the Editor

TAPPING HIDDEN WATER

Sir,

I read your special double issue "Water and Life" (July-August, 1964) with great interest, as it dealt with the sort of problem that affects much of Tanzania. During the greater part of the year most of the area is very dry, and in the rainy season torrential downpours wash all at once down to the rivers taking with them a large part of the topsoil, and leaving behind sandy wastes.

Even in the dry season the rivers here retain lots of water beneath their sandy beds. I have long been considering how to make use of this water to irrigate the nearby land and, in the rainy season, how to use the same means of irrigation—working the opposite way—to retain the water as long as possible on the land and thereby help it to infiltrate the soil.

The main thing is to find a cheap way to start the project so as to get other people interested in doing the same thing. For that reason I intended to start a pilot project by digging a well into the river bed and taking out the water by means of windmills and canal systems. Your issue has made me much more aware of the possibilities, but also of the dangers involved—as in the case of using salty water for irrigation, etc.

F. J. H. van de Laak
Shinyanga, Tanzania

SWORDS INTO PLOUGHSHARES

Sir,

Special thanks are due to you, and to the noted scientists who also made their contribution, for the November 1964 issue.

I admire your courage in condemning the folly of politicians who lack the courage to spend the sums required to meet basic human needs, preferring instead to devote a growing proportion of their countries' revenues to the tools of universal destruction.

What a striking comparison you have drawn. On the one side you show how thousands of millions of dollars are swallowed up in producing the means to kill millions of innocent people, and leave those who might escape the immediate effects of a nuclear holocaust only a slim chance of survival. As opposed to this apocalypse, you present clear and eloquent facts and figures showing constructive and humanitarian alternatives that would bring health, knowledge, skills and happiness to all mankind.

Lucien Joubert
Paris, France

Sir,

I was very shocked by your recent issue on nuclear hazards and the cost of armaments—not by its contents, but by the fact that you actually published such an issue.

Your official title is The United Nations Educational, Scientific and Cultural Organization, yet you publish a political review presenting the views of certain countries and distribute it in another country which has decided, rightly or wrongly, to follow a different policy. This is unfortunate, at it might well give the impression that Unesco is something it should certainly not be. I am not sure that I can say "something it certainly is not".

Jacques Plouin
Paris, France

Sir,

Congratulations on your November 1964 issue. The stand you have taken against war and above all against all preparations for war can leave no one in doubt as to your sincerity and the value of what you are trying to achieve.

G. Lebec
Joinville-le-Pont, France

FESTIVAL OF FRATERNITY

Sir,

The kind of nationalism that promotes such conceptions as the hereditary enemy, revenge by force of arms, the glory of the victors, the decadence of the vanquished is now outdated. Unesco should ask all nations to agree on a single day of remembrance for all the victories of the past and for all who died for their country—a commemoration that could be called the Festival of Fraternity.

Marcel Miodovnik
St-Cloud, France

WESTERNMOST SUBSCRIBER

Sir,

... Last week, we enrolled a Courier subscriber on Valentia Island, off the Kerry coast, the westernmost inhabited island of Europe. The next parish is in America.

Jiri F. Vranek
Dublin, Ireland

CULTURES WITHIN CULTURES

Sir,

I would like you to publish studies on any of the minority groups in European countries. Alongside, the "official" cultures in many modern states there are others, still too little known to the world at large, but giving ample proof of their vitality and significance. In Spain, apart from the Castilian tongue and literature, we have the Catalan, Basque and Galician cultures, and there are similar examples in other countries.

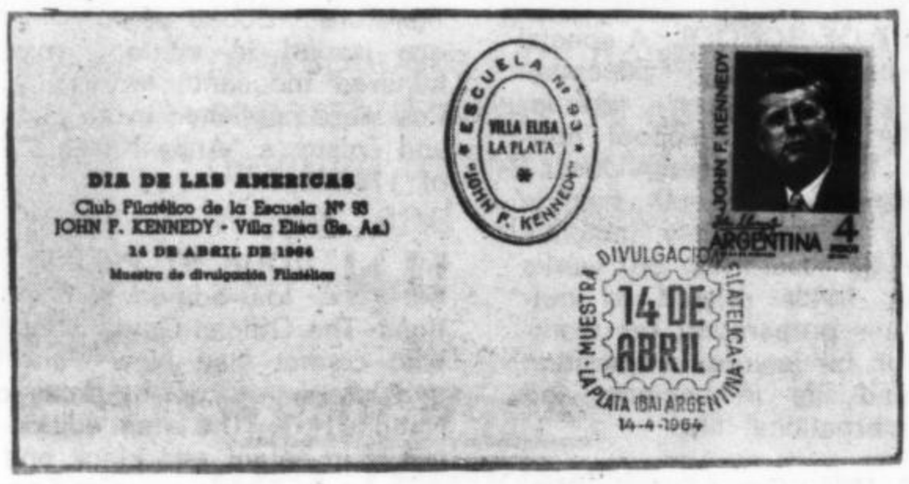
Jaime Diaz y Llorens
Barcelona, Spain

PHILATELY AND FRIENDSHIP

Sir,

The article on Maria Montessori (April 1964) and her work on behalf of "education for peace" highlights the importance of forging friendships between the youth of different countries. One of the most practical and realistic ways to "educate for peace" is through philately in schools which creates international exchanges and stimulates an interest in other countries.

We have formed a philatelic club at my school and on The Day of the Americas (April 14) we held a small exhibition. This was also the day on which Argentina issued a stamp honouring the late President John F. Kennedy (see first day cover above). Many of the children have been encouraged to start stamp exchanges with pen friends. It would mean a great deal to them if others knew about their club and wrote to them, thus giving wider interest to their philatelic work.



Nancy T. de Pérez Tiribelli
John F. Kennedy School
Villa Elisa, Buenos Aires, Argentina

ARAB LITERATURE

Sir,

I enjoyed your wonderful article on Shakespeare (May 1964). I should like you to publish in your international magazine an article on Arab literature, perhaps based on the works of a great Arab poet or writer, just as you chose Shakespeare to symbolize English literature.

El Mortadha
Khanga Sidi Nadji, Algeria

From the Unesco Newsroom...

UNESCO POCKET ART SERIES: Four new titles have recently been added to the Unesco Pocket Art Series: little books that present high quality reproductions of art masterpieces at popular prices. They are: "Aboriginal Paintings" from Australia, "Greek Mosaics" of the Byzantine Period, "Buddhist Paintings" from shrines and temples in Ceylon, and "Czechoslovakian Miniatures" from Romanesque and Gothic manuscripts. A co-operative effort by publishers in different countries has made possible a low sales price: 6/- for the English edition and 95 cents for the U.S. Unesco Pocket Art Series are published in London by Collins, and in New York by the New American Library of World Literature, Inc.

'TALKING BOOKS': Besides its large collection of texts transcribed into Braille, the Hungarian Association for the Blind has set up a library of "talking books", consisting of some 300 classical works by Hungarian and other authors recorded on tape. The tapes are also loaned to blind Hungarians living abroad.

EDUCATION OUT OF SCHOOL: A special issue of Unesco's quarterly, "Education Abstracts", (1) presents an international bibliography on out-of-school education, prepared for the recent Unesco International Conference on Youth, held in Grenoble, France. The review includes information from 32 countries on works published in four fields related to out-of-school education: preparation for working life, preparation for leisure; preparation for citizenship and life in society; and preparation for international life.

(1) Vol. XVI, Nos 1-2, 1964, "Out-of-School Education for Young People", Unesco, Paris; 60 cents, 3/-, 2 F.

HOW MANY POLAR BEARS? An estimate based on a census made in Alaska suggests there are some 18,000 polar bears in the world, all in the arctic regions. Another estimate based on the number of denning bears on Wrangel Island in the Soviet Arctic puts the number at no more than 5,000-8,000. A Canadian Wildlife Service official believes there are well over 10,000. Whatever the total, the largest polar bear populations are in Alaska, Canada and Norway (Spitsbergen).

TOOLS FOR SCIENCE TEACHING: Planned by the Government of Burma with Unesco's assistance, a plant to mass-produce science teaching equipment for Burma's schools and laboratories is going into operation at the Union of Burma Applied Research Institute in Rangoon. The project has been supervised by Burmese scientists and research officers and a Unesco specialist from Sweden.

CZECH READERS' CLUBS: Readers' clubs in Czechoslovakia now have a total membership of 1,200,000 and include two clubs for young readers, one for poetry lovers and one for readers of technical literature. Books selected by these clubs are issued in editions reaching several hundred thousand; works by Edgar Allen Poe were published in an edition of 210,000 and Tolstoy's "Anna Karenia" in an edition of 179,000.

U.N. TOUR BY PROXY: The new colour-edition of "Your United Nations--The Official Guide Book" offers those who cannot visit New York an attractive and interesting tour-by-proxy of the United Nations H.Q. The latest edition lavishly illustrated in colour and black and white offers many new features, including a four-page full-colour section on U.N. postage stamps and a chapter on works of art at the U.N. H.Q. Available from U.N. sales agents this 12th edition, 1964, costs $1.50 (paperback) and $3.50 (hard-cover).

Barbara Ward
A Correction

The Unesco Courier published in its September 1964 issue a series of articles based on the Unesco book "Women in the New Asia", edited by the British sociologist, Barbara E. Ward. Owing to a similarity in names, the author's note published in this issue incorrectly attributed to Miss Ward biographical details concerning Barbara Ward, (Lady Jackson) the British author and economist.

Barbara E. Ward (in private life Mrs. H. S. Morris) was lately lecturer in anthropology at Birkbeck College, University of London, and is now at the University of London's School of Oriental and African Studies. In 1963-64 she was visiting lecturer in the Department of Anthropology, Cornell University, Ithaca, New York. Barbara E. Ward is a member of the Royal Anthropological Institute of Great Britain and Ireland, the Association of Social Anthropologists, the British Sociological Association and the Institute of Race Relations, London. She is the author of "A Chinese Fishing Village" (Journal of Oriental Studies, University of Hong-Kong, 1954); "Some Observations on New Religious Cults in Ashanti" (1956); and "Cash or Credit Crops?" (Economic Development and Cultural Change, Chicago, 1960).

Barbara Ward Jackson, Lady (Robert) Jackson, joined the staff of The Economist in 1939 as an Assistant Editor. In 1957 she began lecturing at Harvard University. She is the author of "The International Share Out" (1938); "Turkey" (1941); "The West at Bay" (1948); "Policy for the West" (1951); "Five Ideas that Change the World" (1959); "India and the West" (1961); "The Rich Nations and the Poor Nations" (1962). The Unesco Courier wishes to express its regrets to both writers for the error in its Sept. 1964 issue.

U.N. stamp honours Education

It has been calculated that more than two-fifths of the adult world population—well over 700 million people—is illiterate, and according to some estimates the figure is increasing by 20 to 25 million persons each year. Illiteracy has disastrous effects on economic and social progress; the map of world illiteracy is practically identical with that of underdevelopment. A recent U.N. commemorative stamp on "Education for Progress" (right) focuses attention on this problem and commemorates the work already accomplished by the United Nations and its Specialized Agencies, including Unesco, to combat illiteracy. The stamp is issued in 4, 5 and 11 cent denominations. As agent in France of the U.N. Postal Administration, Unesco's Philatelic Service stocks all U.N. stamps and first day covers currently on sale. For further details write: Unesco Philatelic Service, Place de Fontenoy, Paris 7e.

Flashes...

■ *For a total world population of 3,000 million there are only 1,5 million doctors, reports W.H.O. While some countries have one doctor for less than 500 inhabitants in others the proportion is one to 50,000.*

■ *Yugoslavia has become the 24th country to ratify the Convention Against Discrimination in Education. The Convention came into force in 1962 after adoption by the Unesco General Conference. It is designed to promote equality and justice in access to education.*

■ *Some 300 million copies of nearly 8,000 daily newspapers are read by the world's peoples reports a new Unesco booklet, "World Press-Newspapers and News Agencies". Material for newspapers is provided by 150 news agencies operating in 80 countries.*

■ *Through its current five-year teacher training plan (1960-65) Pakistan is raising the number of primary school teachers from 127,000 to 197,000. Under this plan two education centres and 55 training schools have been set up.*

Imp. GEORGES LANG, PARIS. IMPRIMÉ EN FRANCE.

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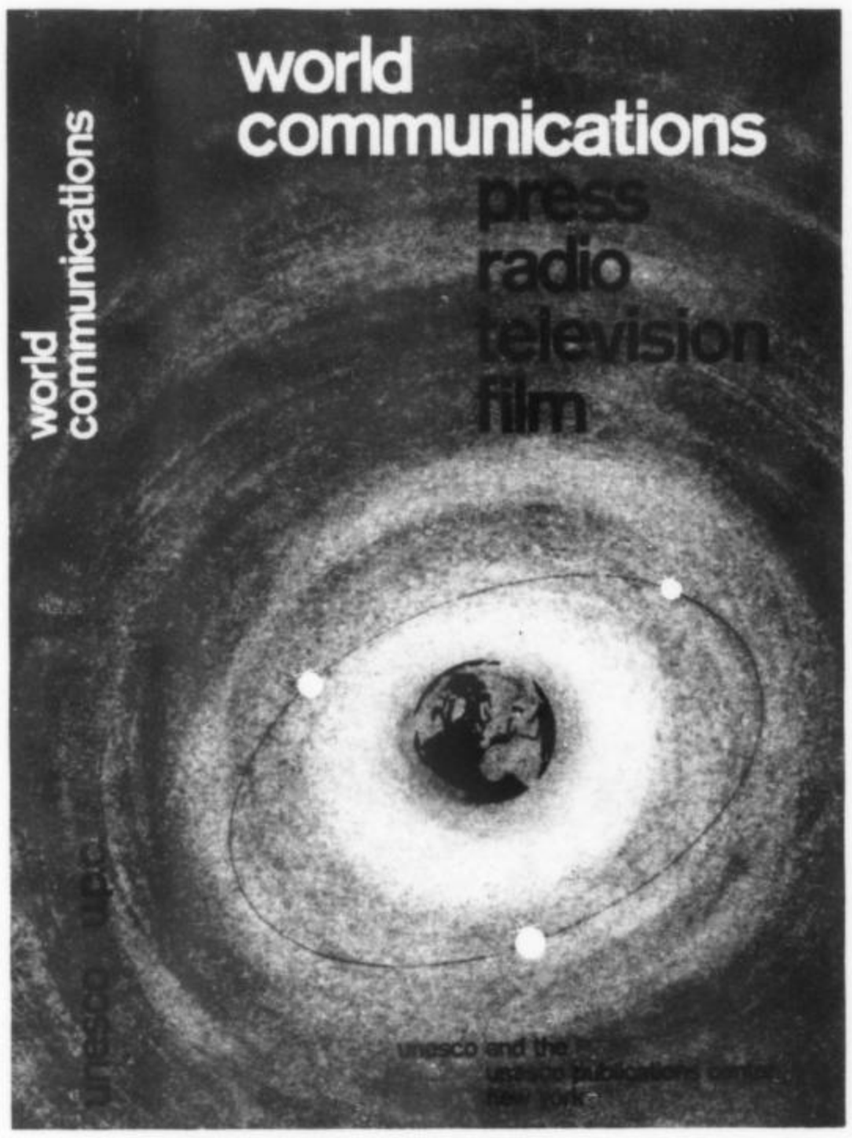

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Ambassadors of art

Otto Paul Wenger, Bern

Since they were invented in Asia Minor some 2,600 years ago, coins have served as travelling ambassadors, carrying images of many peoples and their cultures across seas and frontiers to other lands (see page 27). Many ancient coins, like this silver piece of 10 drachmas (diameter 1.25 in.) minted at Syracuse, a Greek colony in Sicily, early in the 4th century B.C. are veritable works of art in metal. Among the Greeks, artistic merits were a primary consideration in designs for coinage, as is shown by this noble head of Arethusa, one of the nymphs of Greek mythology. The signature of the artist, Kimon, is partly visible on the headband worn by the nymph.